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This is Not an Exposure, But an Exposition for Betterment

*Is Not the Remedy for Business Ills
in the Commercial Car Field After
All to be Found by Honest Vivisection?*

This Article is a Portrayal of Plain Facts, Simply and Pointedly Told by a Man Who is Acquainted With All the Ramifications of the Motor Truck Industry Through Ten Years' Experience. Read It; He Neglects Nothing

THE problem of most importance today in the truck industry is the development of better dealers.

This subject was discussed in the October issue of the COMMERCIAL CAR JOURNAL, the article pointing out why dealers were not successful. The dealer's side is now presented by James A. Inness, sales manager for a well known truck in New York City. After complimenting the COMMERCIAL CAR JOURNAL for bringing the subject of the better dealer to the attention of the industry, Mr. Inness said:

There is no question whatever but that dealers are getting harder and harder to secure, and it is only a question of a comparatively short time when it will be practically impossible. Is there a solution? There must be, for there is a solution to practically every problem—in fact there has got to be one to this problem or a lot of motor truck manufacturers are going out of business.

Are the Salesmen Responsible?

I have been in the motor truck business for over ten years now, and in that time I've done about everything—I've repaired and driven them, I've sold them both retail and wholesale, I've taken old branches that weren't paying and made them pay, I've worked with dealers and manufacturers in opening new places, and I want to say that the toughest job in the lot is the wholesale. I'll venture to say there isn't a business in the world where salesmen are hired and fired as rapidly as in this particular branch of this particular business.

Is the trouble with the class of sales-

men? I should say decidedly not. I have met a lot of them—I've had a lot of them work for me, and I know most of these wholesale men are enthusiastic, hard-working fellows, and, as a rule, above the average traveling salesman in intelligence and sales ability. And yet the annual salesman "turnover" in the motor truck industry exceeds that in any other about 10 to 1. Probably you doubt this. Well, look over your records for the past few

years and then make some inquiries in other lines of business. I know the results will surprise you.

Market Unlimited

Is the trouble with the market itself? A few minutes with statistics will disprove this theory. As a matter of fact, I don't believe there is a field in the business world offering such possibilities for the future as the motor truck business. We have hardly scratched the top.

Begins to look as if it might be in the method, doesn't it? Personally, I believe it is.

For one thing, I never could understand why a sales manager tried to get his line placed all over the United States at once. In any other line of business they start in a small circle and expand—in the motor truck industry they seem to just jump out and take a chance on where they are going to land. I had an amusing illustration of this point a short time ago—a certain factory man was telling me he had just made a jump of fifteen hundred miles (three thousand miles round trip) and closed a new dealer, selling him four trucks, and at the time I knew that within a radius of one hundred and fifty miles of this manufacturer's home town a competitor was selling more trucks annually than this first man made.

Develop Home Territory

Wouldn't it be much better business policy to work the home territory first?

Which brings up another question. I've never had settled to my satisfaction why all truck manufacturers are so set on breaking into New York City, regardless of whether they are ready to or not? It is



James A. Inness

undoubtedly the largest retail market in the world today, but it is also the most keenly competitive and the hardest to break into. Yet I have had men come to me and want me to try and get them a New York dealer when they couldn't show a truck in operation within three hundred miles of the city, and whose dealer's plan was the stereotyped one.

It seems to me the logical thing, particularly for the smaller manufacturers, is to work in an ever increasing circle with the factory as the centre. Then, as they increase their circle they are able to give the dealer much better ground work to start on. For example, a list of users within a reasonable distance of his territory. This is an exceedingly important factor in selling, because the strongest point you can possibly make with a retail prospect is to give him a list of users as near him as possible. He may be impressed with the looks of your truck, and he may like the various units in this truck, but what is of most importance to him is—How does the truck perform, and how does it stand up? In retail work my men all have a list of owners in their data books that is very carefully kept up to date, and this list not only carries the owner's name and address, but the telephone number, and in the case of firms, the name of the man to talk to.

The Old Catalog and Photo Stunt

"Well, no, Mr. Smith, we haven't any of these trucks running right around your town, but here is a picture of one in Kalamazoo (or Oshkosh or Alaska) that has been in service for a long time and is giving splendid satisfaction." If I had a dollar for every time I've pulled that one I'd retire.

Another thing in favor of this method is that the territory can be studied more carefully and any necessary minor changes in the line made to adapt it to new conditions.

Still another thing, the manufacturer is able to keep in much closer touch with his dealers, knows their problems better, can help them more easily, and in that way can very largely stop this so-called "Dealer Turn-over."

Red Fire at First; Red Flag Later

This latter condition is one of the very worst things we have to contend with. Your man signs up a dealer in a certain city, gets an order for a carload or two, the band plays, the flag goes up, everybody cheers, and he is off. Maybe for a time he sells some trucks, but shortly things slow up, sales are made less frequently and finally cease altogether. In the end the contract is cancelled, and in that territory are a number of dissatisfied and disgusted owners of your trucks. Some of these owners have put all their money in your truck on the strength of specious promises made by your representative (and that is just what an agent is) and are now left high and dry. Six, nine, maybe twelve months elapse before you find another dealer, and then he has to live down the bad reputation your trucks have earned.

Do you help him? Not so you can notice it. In effect you say to him, "Mr. Jones, we want you to take our line. It's a mighty valuable franchise. Of course, we know we have had three agents in the last five years—two went broke, the third died, and our trucks have been 'orphans' for the past six months, but you take it on the same terms as the other fellows and see if you have any better luck." That would appeal to the average hard-headed business man, wouldn't it?

Volume vs. Sales

I was talking with a factory man on this subject the other day and his objection was that he wouldn't be able to get volume. Nonsense! Tell a successful sales manager in any other line you do not believe in intensive selling methods (which is all this is) and he will laugh at you.

Right here—I believe we have got to bring into this business a different class of man as a dealer. With the average garage man or pleasure car dealer the truck is a side line.

What we have got to have is a man who expects to make his money out of trucks and trucks alone, and in order to attract this type of man the manufacturer has got to change his present methods.

In the first place, contracts have got to be revised so as to be fairer to "the party of the second part." It is entirely possible to draw a contract that will be much more equitable to both parties.

In the second place, there has got to be much closer and better co-operation between the manufacturer and the dealer in the sales work. Instead of taking his order and his contract (those two words "order" and "contract" are put in this way purposely) and catching the next train out of town, wouldn't it be much better if your salesman sat down with his dealer, analyzed his territory, helped him map out a plan of campaign and then make a full report to the Sales and Advertising Departments, showing the character of this dealer's territory, the class of trucks he would probably have the most call for, the kind of advertising they both felt would be most beneficial, the probable competition, etc., etc. It seems to me this would enable both of these departments to work much more intelligently than most of them do now.

Advertising That Will Aid Dealer

While I am writing about advertising, I want to interject this question. Why will a factory go fifty-fifty on newspaper advertising, and yet won't contribute a cent toward circularizing? I am perfectly willing to admit newspaper advertising is good, but my experience has shown me a good strong line of circular letters to a selected list of names and a constant string of letters to my salesmen's prospects produce better results. I know, of course, that many manufacturers offer to send out form letters direct from the factory to any list sent in, but how in thunder can you expect an advertising manager to write convincing sales letters to a bunch of people he knows practically

nothing about? Why not agree with your dealer upon a publicity campaign suited to his needs, and split the cost with him? It will, of course, take some traveling on the part of your advertising manager, but that won't hurt him—it will do him good. Until I saw one, I imagined an advertising manager was a rare and valuable piece of property that was always kept under lock and key at the factory.

Better Financing Needed

In order to interest the class of man I am talking about the manufacturer has got to devise a new method of helping the dealer stock trucks without excessive cost. He will be compelled to use trade acceptances and occasionally consign. The days of sight draft against bill of lading—if you haven't got the money and your bank won't lend, go to some expensive finance company—are going by, and the truck manufacturer who wants to stay in business will have to arrange his finances along these lines.

The Standard Warranty is going to have to be rewritten, and the method of passing upon claims for defective material radically changed. Why not stand back of your truck as a whole? You sell it that way and your reputation as a manufacturer depends upon the performance of your truck as a unit. As a matter of fact, the dealer has to, and you as the manufacturer should as well.

Another thing—why say "ninety days?" Is a part clearly defective? Why not make good at any time? Manufacturers in other lines do.

Owner Deserves a Voice

Why not give the owner some say as to whether a part is defective or not? Chances are he is a reasonable business man and he resents being treated like a child or a crook.

Some method is needed to speed up the adjusting of claims. We men in the field have trouble enough with this question, and it seems to me the parts makers could easily devise some method of handling claims promptly. The largest part of the cost of making good the damage caused by a defective part invariably falls upon the dealer. Some part of an engine, for instance, breaks and the damage spreads, but the only thing the dealer can get credit for is the part itself (and often has to wait a long time for that). The customer will not stand for the labor, and the dealer can't make him because he knows the customer is right. And, to make use of the other alternative, remove the whole unit and send it back to the factory to be gone anywhere from two weeks to several months means the end of that customer.

Just one word more. It is admitted the motor truck business is not attracting the class of men it should—on the contrary, driving those in it out. Now, if the manufacturer by a change of method can attract a desirable class of dealer, he will automatically solve to a large extent the problems of cut prices, excessive allowances for trade-ins and shady practices, because the new dealer will be too good a business man to resort to such methods.

Some Reasons Why the Dealer Should Sell Trailers

Has the Dealer Failed to Notice the Handwriting on the Wall, by Not Accepting the Trailer as a Logical Auxiliary to the Truck? Doesn't the Owner Look to the Dealer for Complete Transportation Service?

By E. L. MOORMAN, Sales Manager Highway Trailer Company, Edgerton, Wis.



Part of a Fleet of Sixteen Ten-Ton Highway Trailers in Use by the Chicago North Shore & Milwaukee Railroad, Chicago, Illinois

HISTORY repeats itself. The days of Belshazzar are with us again. Take heed, Motor Truck Dealers, if you would continue to gather in the shekels—that your days may be long on the face of the earth—

Your salvation is to sell **transportation** as well as motor trucks. Warnings like these should be heeded:

The General Motors Corp., of Pontiac, Mich., under date of July 21, 1922, have broadcasted the following to its sales organization throughout the world:

"Trailers increase the hauling capacity of motor trucks—(1) By utilizing the reserve or excess power of the engine, and (2) By saving standing time. A motor truck, like a horse or a locomotive, can draw more than it can carry. It is powered to ascend steep grades and to go through heavy mud with full load. Under ordinary conditions it utilizes only a fraction of the full power of the engine."

Trailers Recognized by Tractors

The International Motor Truck Co., of New York, manufactures a complete line of short wheel base truck tractors for trailer use. The same is true of many other makes, which now have their transmissions changed for drawbar pull.

This is conclusive evidence that trailer trucking is rapidly receiving the endorsement of the leading motor truck manufacturers, and that the successful motor truck dealer of the future must consider the **sale of trailers** if he would continue in business.

A Simple Law of Physics

Every standard motor truck is guaranteed by the manufacturer to pull its capacity load up the steepest grades, and through the deepest sand beds—other-



E. L. Moorman

wise the purchaser would not want the truck. Does it not stand to reason then that when operating this self same truck on paved streets, or ordinary country roads, that a vast amount of the truck's power is going to waste?

A motor truck can pull a trailer of **equal** capacity on this waste power, and still have sufficient drawbar pull left to negotiate ten per cent grades and ordinary country roads.

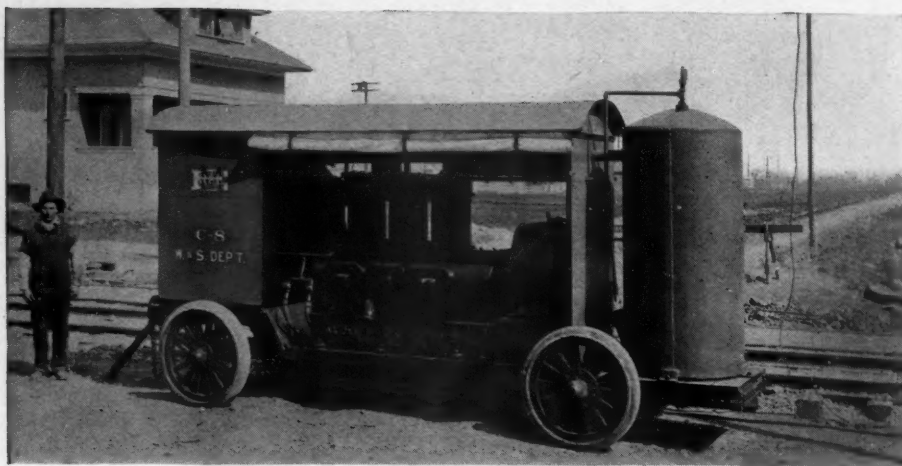
TRUCKS plus TRAILERS means **Transportation**. The trailer prospect naturally turns to the man who sold him his truck for advice and information. Unfortunately for the trailer prospect and the trailer manufacturer, the majority of motor truck dealers and their salesmen, in the past, have discouraged the trailer idea and sold the **trailer** prospect an additional truck. The reason is obvious. In other words, **motor trucks** were sold instead of **transportation**.

This practice has forced the trailer manufacturers to seek other outlets for the sale of their trailers by carrying on a vigorous educational campaign amongst the million truck users in this country, thus creating a demand for greater motor transportation efficiency.

Four years ago practically every motor truck manufacturer was more or less antagonistic to trailer trucking for one reason or another. Today this situation is practically reversed, as has been shown in the first part of this article. This reversal of opinion on the part of the truck manufacturer is bound to react upon their respective dealers, and the writer of this article is proud to say that many of his best outlets for trailers at the present time is through **recognized truck dealers**.

Are You in for Profit?

Every motor truck dealer is in business for **profit**. How many truck sales have been lost because the prospect could not afford the additional investment that such a purchase would require, whereas a trailer application, representing one-fourth or one-third the investment, would have resulted in a sale with several hundred dollars profit to the dealer—to say nothing of a satisfied customer who, with his same



A Highway Drop-Frame Trailer Carrying an Air Compressor for the Milwaukee Electric Railway & Light Company, Milwaukee Wis.

motor truck, same driver, and very little extra gas, oil, etc., **doubles** the efficiency of his truck by utilizing its waste power—such a customer will call back again when in need of another truck.

A dealer selling trailers can sell more trucks by selling trailers to go behind competitive trucks—by showing the user of a competitive truck how he can obtain more efficiency out of his present truck equipment, he makes a friend and eventually sells him his future truck equipment.

Show by Actual Demonstration

In selling trailer prospects it is absolutely necessary to have a demonstrator on your sales floor. The argument that it is necessary to have a motor truck or passenger car on display to show your prospect, **holds good in selling trailers**—in fact, the successful trailer dealer attaches the trailer to his prospect's truck and shows him by actual performance the economy and wisdom of using a trailer with his truck.

Selling of trailers is made easy by showing your prospect photographs of actual installations, testimonials from firms or individuals in the same line of business as your prospect. Such arguments are convincing, and raises this question in the prospect's mind—If Jones can do this, why can't I?

The greatest evil of motor trucking today is the hauling of a "pay load" on a motor truck. This practice not only shortens the life of the truck, but does great damage to the roads.

The road construction program for 1922 calls for an expenditure of approximately one billion dollars for good roads. Taxpayers have taken prompt action to protect their investment. As a result the 5-ton truck and larger sizes have been practically legislated off the roads. Many state legislatures have recently passed laws restricting the loads carried by motor trucks to their rated capacity, thus reducing the earning capacity of a motor truck from 25 to 33 1/3 per cent.

There is only one way to restore this earning capacity and comply with the state laws, *viz.*: attach a trailer of equal capacity to the motor truck, thus spreading the load over six or eight wheels, instead of four. This method protects the

road bed, and enables the truck owner to haul a **double load** every trip—at no more than 15 or 25 per cent additional cost.

The truck dealer, who shows his customer how to make his present motor equipment more efficient by adding trailers, is encouraging the man now driving a team to purchase a motor truck.

Cultivate Those Fields

The following prospects can be cultivated to an advantage: Every telephone company in the United States is a prospect for one or more trailers. Many of the larger companies employ fleets.

Wholesale groceries, department stores, transfer and storage companies, gas, electric and water companies, municipalities, contractors, county road commissioners, state highway commissions, motor transport companies, mining companies, commission houses, oil companies, coal and ice companies, and hundreds of industrial concerns who have any large amount of hauling to do, are merely waiting to be shown.

The motor truck registrations in the United States, as of January 1, 1922, showed approximately 1,000,000 motor trucks in use. Assuming that 50 per cent of these trucks can successfully pull a trailer of equal capacity, and that the average earning per trailer per day is \$10 net (both estimates of which are conservative), we have the huge estimate of \$1,000,000,000 going to waste annually (basis 200 working days per year), or more money than was actually appropriated for the construction of good roads in the United States for the year 1922.

Factory co-operation on the part of the trailer manufacturer, such as developing prospects and turning them over to the dealer for personal follow-up is sure to result into profitable sales. During the past three years the writer has sold thousands of dollars worth of trailers, mostly by correspondence, and in many cases, at list prices. Delivery was made in each case into territory covered by some motor truck dealer. Each one of these sales could have netted some motor truck dealer a **handsome profit**.

Accepting Trailer as an Economical Transportation Factor

By S. E. LIEDABRAND, Vice-President of the Automotive Trailer Corporation

FOR several years I have had the pleasure of coming in contact with dealers and distributors of motor transportation and when first interested in this line of equipment it was astonishing to me to find the average truck distributor did not believe in and was not kindly disposed toward the field of trailers in connection with trucks. Notwithstanding the attitude of the average truck dealer, who seemed to have the idea that the sale of trailers interfered with the sale of trucks, I had one convincing experience that attested otherwise.

As an operator of a fleet of trucks in the cartage business there came to my attention from time to time conditions under which it was impossible to make money by the use of trucks alone and, therefore, trailers were taken into consideration and tried out to my entire satisfaction from an economic standpoint. In other words, I found that by doubling the load or the tonnage moved, my profits were tripled. In other words, by hauling ten tons instead of five tons, my profits would be sixty dollars a day in place of twenty dollars a day, because of the lowering of the cost per ton mile and over-

head expenses on the volume of business transacted on tonnage moved in a day, and naturally my interest in trailers grew apace.

The Word Transportation Means Something; Study It

This started a train of investigational thought and in my mind I have since come to a very satisfactory conclusion. And that is that the successful dealer in motor transportation in the future must devote his energies more to selling motor transportation on a ton mile cost basis than to merely selling his customer trucks. There is no question but that the dealer and distributor who makes a survey of his customer's hauling problem and sells him motor transportation including trucks, tractors and trailers, which will move the greatest amount of tonnage at the lowest possible cost, the equipment being adapted to the requirements of each customer, will be more successful than the man who simply sells trucks and lets it go at that.

There are many instances proven to me in actual practice where a dealer had better recommend a tractor and trailer train

as a means of moving his prospect's tonnage in preference to trucks. All of these things require study of the actual conditions in each individual case. Experience has proven that trailers do not interfere with the sale of trucks, and on the contrary they do materially help, for very frequently a customer who cannot use trucks economically can use trucks and trailers, or tractors and trailers, to an advantage, reducing his ton mile cost to one-half, and in many cases a third of the cost of moving the same tonnage by trucks alone.

In the past six years there has been a remarkable change in the attitude of truck manufacturers along this line; so much

so that some of them are now building a tractor especially for use in conjunction with trailers. In fact, they recommend the use of trailers where they can be used more economically than trucks. The average dealer in the past did not give enough consideration and thought to the requirements of motor transportation. However, present indications lend support to the belief that these considerations in transportation merchandising will be a large factor in the securing of profitable business by motor truck manufacturers, dealers and distributors.

I believe if the matter is properly brought to the attention of the dealers,

manufacturers and users of motor equipment, that the use of trailers will become general throughout the industry to the profit of all concerned. The profit incident to the sale of a trailer is proportionately identical to the profit resulting from the sale of a truck. Moreover, as no service is required, the net results are frequently far better. Therefore, every dealer, distributor and manufacturer of motor trucks and tractors will be very much interested if they will investigate the real facts regarding use of trailers in motor transportation and govern themselves accordingly in dealing with their customers.

Here's a Method of Reducing Idle Time in the Repair Shop



WM. REYNOLDS

This Shop Places Certain Operations on a Piece-Work Basis. Mechanics Are Making More Money and Are Better Satisfied. How Would This Plan Affect Your Shop?

By C. P. SHATTUCK*



D. F. HASTINGS

FACTORY and dealer service men claim that truck service is better today than passenger car service. They base their contention on the fact that the truck is a business unit and as such its owner demands that service which reduces the factor of idle time to the minimum. In other words, the truck owner will not sanction delays, he wants the truck out of the shop in the quickest possible time.

This is, perhaps, quite true. The average truck dealer who maintains a service station or a good repair shop, endeavors to keep his customer's trucks functioning, and to do this some render a night service, from seven p. m. to six a. m. Because of this the truck service man thinks he has it all over his brother in the passenger car industry. But has he?

Passenger Car Service Laps Ahead

Granted that there are less delays in the truck service—although many passenger car service men will not admit it—have the truck service men made the progress in service as has been made by the service station of the passenger car dealer?

After analyzing both branches of service, the writer must admit that passenger car service is several laps ahead of truck service in many respects. No doubt many readers will not agree on this, but if those who disagree with the statement will study those passenger car service sta-

tions which have developed service to a high plane, I am sure they will agree that there is much room for improvement in truck service. Getting the job out on time, as promised, is an important factor in satisfying the customer. Keeping the truck on the road and not in the repair shop is also an important factor. One ties up with the other and in this respect truck service must be given credit. But in regards to reducing the cost of service rendered, of satisfying the owner before the work is started, and perhaps, when finished, passenger car service excels. The service heads of the passenger car dealer are making greater strides towards providing an incentive to the mechanics and in laying the foundation for better and more highly skilled workmen than the truck industry. The passenger car service station—the writer is thinking of real service stations—is better equipped with time and labor-saving equipment and special tools than the truck station. Why? The answer is simple. SALES.

The Rear Door More Important

The passenger car industry has realized for some time that the service department of the dealer's establishment was equally important if not more so than the sales department door. It became an accepted fact that the bulk of the sales would be to owners and that the owner would not purchase another car of the same make unless he was satisfied with the past service. And so the merchandising of "service that satisfies" began. It was not brought about by the desire of the

passenger car dealer to invest money in up-to-date equipment and tools, but it was brought about by sales competition. And the truck industry is facing this condition today.

Although advocated, the flat-rate system is not making any noticeable headway in the truck field. Most truck service stations employ the time and material system and as a result there are many dissatisfied owners. Many truck owners protest against the bill rendered either directly or otherwise. Repeat orders are difficult and when they are secured the cost of selling is high. Why? Because the owner is not satisfied. The work may have been performed correctly and the cost most reasonable, but the owner does not think so. And as long as he thinks the bill is not right it is not right.

Better Service and Greater Profits

It was these factors which affected sales in passenger cars that prompted the dealers to use the flat rate and the principle must be helpful for it is being universally adopted. But broad-minded, visionary car dealers—the type that prepares for future conditions when competition will be even more keen than at present—have gone a step further in service than the flat rate. All of which brings us to the story of how a passenger car distributor in Detroit has solved the service problems, increased the profits of the service station, lowered costs to the owner and best of all provided an incentive to the mechanics by making it possible for them to earn more money.

(Continued on page 60)

*Editor's Note—This is the third article of a series by Mr. Shattuck on the flat rate and piece work methods. The fourth will appear in an early issue.



A Plea for



Better Business Principles

By WARREN FENTON, Wood Hydraulic Hoist and Body Company, Inc., of Philadelphia

AS an humble co-worker in this vineyard of merchandising motor vehicles I place before you a few thoughts which, if applied, may be a means of lessening the great stress and fear which seem to hold full sway among some of the dealers. I may even say that my suggestions may help to change the "Used Car Problem" from a desperate question into a sound business proposition and into harmony among dealers; this in itself would revolutionize the entire industry.

The automobile dealers of today are confronted with many problems. We see discouraged proprietors, blue sales managers, bluer salesmen, disgruntled foremen, careless mechanics and last, but not least, a customer who sets the price for the car at his will, and almost dictates the terms of payment—to the disparagement of the dealer.

It is not my intention to elaborate on the evils of merchandising motor vehicles; too much has been said in this regard before. It is rather that little leaven that leavens the whole lump, which I want to put into the mind of the reader. It is the essential and fundamental word for every organization and successful business. This little word with such an all-powerful effect is "TRUTH"—truth understood and practiced in BIG CAPITALS, that is what is needed in order to bring about confidence and satisfaction in the minds of our business people.

Business Built on Truth is Well Built

The writer observed these inscriptions on one of our Million-Dollar School Buildings: "If it is not true do not say it; if it is not right do not do it," and on the other side: "The height of a pinnacle is determined by the breadth of its base." What tasteful and digressive food for thinking people! To make the

foundation of this pinnacle more complete we will apply another, important thought, which is "LOVE." To quote from Paul's letter to the I Corinthians 13: 1, "Though I speak with the tongues of men and of angels and have not Love, I am become as sounding brass or a tinkling cymbal." As you read on, hold the golden thread of Paul's saying and its lesson as applied to your problems. The world is so hungry for love and truth that, when given with merchandise, the buyer will, likewise, give graciously. "Give and thou shalt receive," it's the law of compensation.

Right Thinking; Right Acting

One may say that these thoughts are fine on Sunday, but cannot be applied every day in the week in the cold business world. But right here he is wrong. The time for thinkers has come, and it is high time that we should awake to the realization that the all-important thing in good business is "Right Thinking" with its subsequent "Right Acting." If we would spend more time in training our thoughts upon that which is the basic principle of true business activities, and if, on the other hand, we refrain from slander, poor business and fallacies, we would learn that our surroundings would mold themselves from a condition of discord to that of harmony, and it would bring to our minds the joy of life and of service.

The automotive industry is a most wonderful business, the largest in America, but what is the matter with our manufacturers and dealers that they find so little compensation as compared with the effort put forth? Does it not condense down to this: that some manufacturers and some dealers may be holding the little penny so close to their eyes that they cannot see the sun rise? Just this little penny may

symbolize the profit in the sale, and the sun may symbolize the great service of which the motor vehicle may be to the needy world. The good and true service rendered by producer through honest and sincere effort coupled with the real sense of loyalty and willingness to serve. Dear Reader, just think with me for a moment: glean this healing truth. The success of an organization depends entirely upon the truth, love, justice and service rendered to all its patrons, and if we are not giving love, truth, justice, and service, how in this wide world can we expect to receive reciprocal values? Does this not prove that what is needed above all else is the distribution of real honest loyal service?

Much has been preached to the salesmen about confidence. Remember that the foundation of confidence is Truth. How can a salesman have confidence in a motor vehicle selling organization when his sales manager promulgates dishonest deeds, such as allowing more for a used car than what it is worth? Such action reflects dishonesty on himself, his organization, his purchases and competitors. Shakespeare said: "To thine own self be true and it must follow as night the day, thou canst not then be false to any man."

Don't Abuse Confidence of Salesman

How can a salesman have confidence when his organization allows the boosting of the price of a used car upon learning that his prospect has one to trade? How can a salesman have confidence in selling service when, through experience, he knows that it is lacking much in just treatment?

The real salesman cannot mesmerize himself into believing that a lie is the truth. Some are trying to do this very thing and are wondering why their sales are not up to the

mark. We must look conditions squarely in the face and take notice of those conditions which are not in accord with good principles, and we have to separate the chaff from the wheat, so that the wheat (truth and justice) may bear heavily the reward of right endeavor.

Take an organization (from the grease hound to the big boss) that practices the spirit of love and service; this organization stands, indeed, on a pinnacle so high that it reaches beyond the clouds of obscurity and its base is so broad that it encircles the globe. We have a few such organizations today, and only because they have been organized with the foundation stone of truth and love, they flourish.

The acceptance of this truth in our industry cannot be adopted collectively, but only individually; if each individual practices these virtues, only then can he awake to the realization of what they mean. Dear Reader, I again ask you to carry this thought with you and to put it to work in your daily activities. You will find true success as you have never experienced before.

If you are a proprietor, let your principle be justice and love, let your activities be guided by kindness.

If you are a sales manager, let your policy be square with no flexibility. Let truth always be your guide, and remember that truth cannot be inflated. This is the keynote for confidence. In demonstrating these qualities, you will find your salesmen will go with you through thick and thin.

If you are in the parts department, be sure that courtesy is your guide and truth your goal.

If you are a shop foreman, extend to your men justice and acknowledgment of work well done; instill them with the thought that they are working for the good of the customer as well as for their own organization. Let them know, when their work is good—not only when it is poor. Praise is an expression of gratitude; kindness is reflected by kindness. You will be compensated by gathering a strong group of boys that will fight for you.

If you are a salesman, just bear

in mind the school motto cited in the beginning of this article. Call on your prospect with the intention of being of some service to him, "Seek ye opportunities to do good," look to his interest more than to your own. Change your thought of "getting" into that of "giving." Learn the true meaning of this expression: "It is more blessed to give than to receive."

Be just to yourself, your firm, your prospect and your competitors in your methods. Let truth and justice be the basis of your thought and deed. You will not find resistance but co-operation. Be a friend, a true friend to your prospect customer and competitor; your willingness in serving them will be reflected back to you a hundred-fold.

Just try and practice a little truth and love in your organization. The automobile industry stands before a world of people; who, with outstretched arms are pleading for truth, love and justice as never before. The harvest is ripe, though the laborers are few—but the day is at hand and the time to start is NOW!

Parts Makers and Specialized Vehicle Builders Meet

Both Groups Get Together Under New Association
Title to Work for Betterment of Truck Industry

PROBABLY no meeting of the National Association of Motor Truck Manufacturers carried more significance than the meeting held on Nov. 22nd, at Detroit, at which plans for a combined association were discussed and which resulted before the adjournment of the meeting in a new association, the Motor Truck Industries, Inc.

Realizing that the problems of the specialized vehicle manufacturers are shared not alone by themselves but also by the parts makers, the board of directors of the old association saw great merit in the idea of getting the parts makers to take an active interest in the association's work and consequently a number of representative prominent parts companies were called to this meeting for the purpose of forming a new and greater organization.

To facilitate matters the directors of the N. A. M. T. I. resigned so that a new board of directors could be more readily elected to include representatives of the parts makers.

The principal object of the enlarged organization will be to promote the sale of specialized trucks by the co-ordinated

effort on the part of both groups. Various merchandising plans were tentatively discussed, as well as methods of combatting wild trade-ins, the used truck situation and so forth.

The association welcomes as members all reputable makers of specialized vehicles, so that concerted action may be taken on problems which may confront the manufacturers of specialized vehicles. The membership is open to all specialized vehicle builders who are making plans or are now distributing on a national scale. The association aims to promote better business conditions and ethics in the truck field.

This organization is looking forward to the day when its members through closer association and a better understanding of each other's problems, will overcome the tendency to bid against each other for dealers and that greater unity in merchandising policies will exist.

To Martin L. Pulcher, president of the Federal Motor Truck Co., credit is given for bringing about the changes which will make this association more active in the promotion of the specialized truck.

The officers of the association are now as follows:

President—M. L. Pulcher, Vice-Pres. and Gen. Mgr. Federal Motor Truck Co.
1st Vice-President—H. T. Boulden, Vice-President Selden Truck Corp.
2nd Vice-President—Fred Glover, President and General Manager Timken-Detroit Axle Co.
Secretary & Gen'l Mgr.—Don. F. Whittaker, General Manager Motor Truck Industries, Inc.
Treasurer—A. S. More, President Denby Motor Truck Co.

Directors

M. L. Pulcher, H. T. Boulden, A. S. More, Fred Glover, and
C. A. Dana, President Spicer Mfg. Corp., President Sheldon Axle and Spring Co., President Salisbury Axle Co., President Parish Mfg. Corp.
B. A. Gramm, Vice-Pres. and Gen. Mgr. Gramm-Bernstein Motor Truck Co.
M. A. Holmes, President and Gen. Mgr., Transport Truck Co.
W. J. Kysor, President and Gen. Mgr. Acme Motor Truck Co.
T. R. Lippard, President and Gen. Mgr. Stewart Motors Corp.
A. E. Parsons, Treasurer and Gen. Mgr. Brown-Lipe Gear Co.
J. W. Stephenson, President Indiana Truck Corp.
L. M. Viles, President Buda Company.
F. E. Wilder, Vice-President Gemmer Mfg. Co.
E. A. Williams, President and Gen. Mgr. Garford Motor Truck Co.
G. W. Yeoman, Vice-Pres. and Treasurer Continental Motors Corp.

Making Inspection a Specialty

How Two Young Men Built Up a Profitable Service and Maintenance Business at a Fixed Sum Per Month. Over 200 Trucks Being Handled at Present

By C. S. PERRIE

THOSE versed in the various ramifications of service claim that there are two principal factors on which it is difficult to sell the owner. These are, first, the importance of periodical inspections including proper lubrication, and, second, making minor adjustments and repairs when necessary. It is well known by service men and engineers that the truck running low in operating costs to the owner (ton mile or otherwise) is the truck that is periodically inspected, adjusted and carefully lubricated. To these should be added the factor of refraining from overloading and over speeding.

Inspections Are Generally Slighted

The average dealer and his service director will say that it is extremely difficult to convince the average owner that he will save money in the long run if his truck is periodically inspected and adjusted. In the beginning some owners are sold on the value of inspection, but in time the calls at the service station cease and they are not renewed until necessity compels it. Free inspections, free adjustments and even free lubrication have been tried, but a certain class of owners will not respond even to this kind treatment. Many dealers have attempted to solve the inspection problem by maintaining traveling inspectors who inspect on the "catch-as-catch-can" plan.

The chief objection to the call-at-the-service-station plan is that the average owner thinks it is losing him time and money, and the average driver is not sold on going to the service station. Also many owners believe that the inspection means that the mechanics will find some excuse to run up a bill of expense. Under these conditions the dealer and his service head is more or less helpless for neither have **any control over the truck.**

If an owner will not send his truck around the service head cannot compel him to, and the service head may talk his head off but not get any definite results. Also flooding the owner with letters—telling him that a certain component is badly in need of attention and that unless it is attended to will mean big expense—does not always get over. Some service heads stick these letters or reports under the nose of the owner when the latter kicks over the size of the bill with a "We told you so. We warned you, etc."

There is in New York City a young concern comprised of young men who

have tackled these problems and after several months trial believe they have solved the inspection, adjustment and lubrication problems. One of the young men served considerable time in service with one of the large and well known truck manufacturers who maintains a big factory branch in New York. This young man was more than a unit in the service organization. He was a thinker and a student, and noting that the owners were not joyful when the bills were presented he analyzed the whys and wherefores.

One of the things he discovered was that there wasn't the right kind of contact with the owner by the service department.

Another was that the owner fought shy of the service station because he believed that when the doors closed on his truck a gang of experts would find more trouble than should be found.

In other words, if the driver reported that the valves needed grinding, carbon should be removed and tappets adjusted, the service station trouble finder would make out a report calling for a complete rebuild of the engine. Of course there might be necessary work other than that which the driver said there was—the drivers always minimize the troubles—but somehow or other the owner makes up his mind that he will get a modest bill when the telephone rings and he is informed that a lot of trouble has been discovered. Will the owner authorize the work? If he does he will grumble when he gets the bill just the same.

This young man also found a number of other factors, trouble makers, such as overloading and overspeeding. For example, he knew that if a certain make was overloaded that a certain component of the brake assembly would snap.

Now this young man, and his associate, decided that there was a field in New York for a service that would establish and maintain direct contact with the owner and one that would indirectly pass the control of the driver and trucks to the service station. In other words it was proposed that for a fixed sum annually the service station would assume maintenance costs, i.e., adjust, repair and lubricate. Parts, however, to be paid for by the owner.

Study Transportation Requirements

The prospect for the service, which is virtually service insurance, is approached from a transportation standpoint. The

use of his trucks in his business is analyzed so that the service company may be entirely familiar with the conditions under which they operate. After the analysis an estimate is prepared and based on a year's service. In the analysis, if it be found that the trucks are being heavily overloaded, the effect of this in repairs, dollars and cents, are diplomatically pointed out to the owner.

Next, and before a contract is signed, the mechanical condition of the chassis must be up to certain standards. In other words the service company will not accept a truck all shot to pieces and assume maintenance. If it did the owner would surely be pleased to pass the buck. Assume that the truck or trucks have been run a year or so without proper attention, and the owner desires to contract for service on the annual service basis. The trucks are carefully inspected and an estimate made up of the essential work. Now this work must be done, i.e., the condition conform to the standard set. It does not mean exacting requirements, but rather a condition for practical operation. If the timing gears are slightly noisy it is not required that new ones be installed. What the service company requires is that the truck be in a reasonable mechanical condition.

After the work is done the service, outside of parts, is taken over. It does not include, however, repairs due to accidents, broken springs, caused by overloading or burned out bearings.

The Inspection Angle

The service contract virtually amounts to giving the service company control and authority over the driver. This does not mean that the big stick is employed. Effort is made to handle the driver diplomatically, but the driver knows that his employer will be made aware of any failure of the former to keep his part of the contract. A schedule of inspections is arranged by the service company and the trucks must come in according to schedule. That is written in the contract. If they fail to come in one week after the date set the responsibility, costs, automatically pass to the owner.

The operation of the trucks is not interfered with by the schedule. Some fleet owners send their trucks in during the day. Others have the inspection made nights. There are three crews of mechanics or rather three shifts. One crew works until one p. m., another from five

to nine p. m., and the entire force from one to five p. m. Each truck owner is required to give the service station half a day each month for tightening, adjusting, etc., in addition to the night work.

The service includes a lubrication service. This service may be secured aside from the contract service. The truck is thoroughly lubricated and nuts and bolts tightened. Inspection is rigid and when an adjustment is necessary it is made. The entire service plan is based on anticipating troubles which develop from neglect and abuse. If the driver is abusing his truck the inspections will reveal it and the matter is taken up with the owner, provided the driver fails to heed the advice given. Having assumed responsibility for the trucks the service company is in a position to insist on the owner living up to his part of the contract. This the service company must do to protect its investment.

Servicing Six Makes

The company is servicing six different makes of well-known trucks and the mechanics are specialists on these. Data has been prepared on service costs on all of these makes. The exact number of

hours required to make a replacement of a part or perform a given repair is known and the estimate or contract is based on these figures. This closely approximates the flat rate system insofar as labor is concerned. As has been pointed out the service company does not sell parts. The owner can either buy and supply the parts or authorize the service company to do so. This relieves the company of stocking parts and the overhead of a stock department. All of the trucks serviced have factory branches in New York so parts are readily obtainable. Thus it will be seen that the service company is merchandising labor, i.e., service. A few units are stocked, such as a relined brake band to conserve time. The brake inspection is very rigid.

Builds Right Kind of Contact

This is a general outline of the service which is novel in that the owner knows what it will cost him for repairs per year. The plan has its advantages in that it provides for periodical inspections and anticipates big bills due to neglect. It was stated by the service company that the plan is practical from the financial

standpoint and that it gives them a direct contact with the owner that the dealer and his service head has not. If springs break from overloading the service company can sell the owner on the trouble with a punch, i.e., an extra charge above the contract. Also suggestions can be made for getting better results from the truck without the owner taking offense. Another advantage is that the owner will send his trucks in for inspection and work because he knows what he has paid for and that there is no extra bill of expense to accrue.

The service company giving this service is Sloyan & Mitchell. Mr. Mitchell stated to the writer that although the plan has been in effect not quite a year it has proven practical. Something like 200 trucks are being serviced at present and the number is being augmented as fast as Mr. Mitchell can sell the service. When the writer asked Mr. Mitchell if he did not think it was a speculative service, Mr. Mitchell replied in the negative. The plan presents many interesting features and brings up the question: "Will trucks of the future be serviced on a fixed sum annually?"

Program for Chicago Convention of American Road Builders' Association

Meeting to be Held January 15 to 19, in Conjunction With Good Roads Show at Coliseum

Opening Session

Tuesday Morning, Jan. 16, 10 A. M.
Chairman—Thomas J. Wasser, State Highway Engineer of New Jersey, President American Road Builders' Association.

President's Address Greeting and Inspiration

James H. MacDonald, Treasurer American Road Builders' Association.

Continued Highway Expenditures Required to Meet Traffic Demands of the Future
Thomas H. MacDonald, Chief U. S. Bureau of Public Roads, Washington, D. C.

Progressive Construction of Highways

- (a) Practice in North Carolina. By C. M. Upham, State Highway Engineer, North Carolina.
- (b) Practice in Iowa. By C. Coykendall, Assistant Chief Engineer Iowa Highway Commission.

The Obligation of the State Highway Department to Keep the Public "Sold" on Highways

H. E. Hilts, Acting Chief Engineer Pennsylvania State Highway Department, Harrisburg, Pa.

Design

Tuesday Afternoon, Jan. 16, 2.30 P. M.
Chairman—Thos. H. MacDonald, U. S. Bureau of Public Roads.

What Test Roads Results Have Taught Us
(a) Bates Test Road. Clifford Older, State Highway Engineer of Illinois, Springfield, Ill.

(b) Pittsburgh Test Road. Lloyd Aldrich, Consulting Engineer, San Francisco, California.

(c) Arlington Tests. A. T. Goldbeck, Engineer of Tests, Bureau of Public Roads, Washington, D. C.

Development of Apparatus for Field Testing of Roads

H. F. Clemer, Testing Engineer Division of Highways, Springfield, Ill.

Developments in the Use of Local Materials
Vernon M. Pierce, District Engineer U. S. Bureau of Public Roads, Washington, D. C.

Designed Subgrade

C. M. Upham, State Highway Engineer, Raleigh, N. C.

Construction

Wednesday Morning, Jan. 17, 10 A. M.
Chairman—J. H. Cranford, President Cranford Paving Company, Washington, D. C.

Haulage Methods in Highway Construction
Industrial Railways. A. J. Parrish, General Contractor, Paris, Ill.
Heavy Truck Haulage. Charles H. Fry, Chas. H. Fry Construction Co., Erie, Pa.
Light Truck Haulage. A. E. Horst, Henry W. Horst Co., Rock Island, Ill.

How to Equip and Operate Local Gravel Pit to Produce Concrete Aggregate

H. E. Kuelling, Construction Engineer Wisconsin Highway Commission, Madison, Wis.

How Much Time is Lost in Delays in Highway Building?

H. K. Davis, Chief Inspector Iowa Highway Commission, Ames, Iowa.

Discussion: B. H. Piepmeyer, State Highway Engineer of Missouri, Jefferson City.

What Roadbuilding Work Can be Done in Winter?

John H. Mullen, Chief Engineer Minnesota Highway Department, St. Paul, Minn.

Maintenance

Thursday Morning, Jan. 18th, 10 A. M.
Chairman—A. R. Hirst, State Highway Engineer, Madison, Wis.

Organization of Intensive Maintenance on a State Highway System in Eighteen Months

Frank Page, Chairman North Carolina State Highway Commission, Raleigh, N. C.

Four Years' Experience With Patrol Maintenance in Wisconsin

J. H. Donaghey, Maintenance Engineer, Wisconsin Highway Commission, Madison, Wisconsin.

Gravel Road Maintenance Practice in Michigan

L. H. Nielsen, Deputy State Highway Commissioner of Michigan, Lansing, Mich.

Blade Grader and Road Drag Earth-Road Maintenance in Iowa

W. H. Root, Maintenance Engineer Iowa State Highway Commission, Ames, Iowa.

Salvaging and Maintenance Macadam Roads

W. A. Van Duzer, Assistant Maintenance Engineer Pennsylvania Highway Commission, Harrisburg, Pa.

Discussion: A. W. Muir, Superintendent of Maintenance New Jersey Highway Commission, Trenton, N. J.

Traffic

Thursday Afternoon, Jan. 18, 2.30 P. M.
Chairman—Thomas J. Wasser, State Highway Engineer, New Jersey.

Tourist Traffic as a Factor in Highway Development (Illustrated)

A. R. Hirst, State Highway Engineer of Wisconsin, Madison, Wisconsin.

Changes Needed in Motor Vehicle Legislation and License Fees

J. N. Mackall, Commissioner of Roads, Baltimore, Md.

Discussion: Leon C. Herrick, Director of Highways and Public Works, Columbus, Ohio.

Harry Meixell, Jr., New York, National Automobile Chamber of Commerce.

Election of Officers.

Business Meeting.

Finance and Miscellaneous

Friday Morning, Jan. 19, 10 A. M.
Chairman—Frank Page, Highway Commissioner of North Carolina.

Have Large Expenditures Changed the Public Attitude Toward Highway Development?

S. E. Bradt, Former Superintendent of Highways of Illinois.

Co-operation Between State and County Highway Department

L. C. Herrick, Director of Highways and Public Works, Columbus, Ohio.

How Individual Organizations Can Fit Their Work into the Broad Highway Research Program

W. K. Hatt, Director Highway Research Committee, National Research Council, Washington, D. C.

Correction

An error was inadvertently made in the caption under an illustration depicting a Model S International speed truck in the service of the Sound View Transportation Co. appearing on page 14 of November issue of the COMMERCIAL CAR JOURNAL. The caption described the truck as being a GMC bus, which it is not. The Sound View Co. employs two Model S International buses and while it is possible they may also employ a GMC bus, the picture is that of an International. Therefore, the 41,000-mile record credited to the GMC is in this instance actually covered by the International bus.

The Development of the Electric Vehicle Battery

The Highly Perfected Vehicle Battery of Today No Longer a Deterrent to the Sale of Electric Trucks. Troubles of Earlier Types Have Been Entirely Overcome

By C. P. SHATTUCK*

IN a previous article dealing with the advance made in designs by the electric truck industry we stated that much improvement had been made by battery manufacturers and that a higher rate of speed and greater mileage per charge is now obtainable. It is these improvements, backed by a very liberal guarantee, plus a very high grade service, that is responsible for the progress made by the electric vehicle.

Before contrasting the vehicle storage battery of today with that employed years ago, it may be well to correct the impression gained by some, that the small storage battery used in the gasoline passenger car and truck is identical with the battery employed to supply power for the electric truck.

The SLI, starting, lighting and ignition battery may be termed an equipment unit, in that it is a very small power reservoir for the electric system. It has great starting ability and capacity per unit of weight and volume, the main essentials for which it is designed.

How Truck Battery Differs

The electric vehicle battery differs in that it supplies the energy by which the truck is propelled. Figuratively speaking, it is the heart of the vehicle and as such must have great power ability, ruggedness, efficiency and long life. It must also have ability to discharge at very high energy rates, an important factor where the vehicle is employed in hilly sections or operated over bad roads. It must be easily cared for and capable of giving service over long periods with a minimum of attention. It should be able to deliver at least 80 per cent of its capacity after years of service, and, consequently maintain maximum mileage.

These characteristics were not obtained in the early lead type vehicle batteries. Short circuits, corrosion, deterioration of components, etc., caused considerable trouble, and although the early types gave fairly satisfactory service they lacked long life and efficiency and required constant attention.

Realizing that the electric truck industry's progress depended upon the battery the battery engineers began to develop types which would meet the industry's requirements. That they have been successful is indicated by the fact that the slogan of the electric truck industry is "a vehicle with an average life over 10

years." The confidence of the battery maker is reflected in his broad guarantee.

Types of Batteries

Generally speaking there are two types of electric vehicle-commercial-storage batteries, the lead and the Edison. The latter is constructed of steel while the active materials consist of nickel-hydrate and iron-oxide securely held in perforated steel tubes and pockets mounted on steel grids. These grids are mounted on steel poles and placed in a steel container having a welded-on steel cover. The electrolyte is an alkaline solution.

The lead type, such as the Ironclad-Exide, is an example of the big improvement made in batteries employing the acid electrolyte. Its positive plate is a grid consisting of a number of parallel, vertical rods united integrally to horizontal top and bottom frames, the former being provided with the usual conducting lug. Each vertical rod forms a core, which is surrounded by a cylindrical pencil of peroxide of lead, the active material. This, in turn, is enclosed by a hard rubber tube having a large number of horizontal slits which provide access for the electrolyte to the active material, yet they are so small as to practically eliminate the washing out of the material, a fault of the early designs.

Battery Well Serviced

Service has been developed to a very high plane by the makers of batteries in the electric commercial field. The outstanding feature of the service is that the dealer merchandising electric trucks is not compelled to install charging and service equipment although there is a good profit in rendering such service, as will be explained in a future article.

The dealer merchandising electric trucks has the battery service taken off his hands by the battery makers. In other words, after he sells a truck the battery maker assumes the service and responsibilities.

In any case, whether or not the purchaser is a new entry in the electric field the district or branch manager has a service man on the ground when the truck is delivered. The service man thoroughly inspects the battery and makes sure that it was received in A1 condition.

Continuous Service

The service does not stop with the first or second call of the service man, but continues for years, as long as the battery lasts. Periodical calls are made on

each user, first to see that the battery instructions that were given are observed and, second, to make recommendations that will improve the service of the vehicle. It is the policy of one battery maker to have present, if possible, the owner when inspections are made. This concern stamps a serial number on the cover of each cell and a comprehensive record is kept of each cell at the factory.

Service Broad in Its Scope

Should trouble develop between the intervals of inspection, the owner who is not conveniently located to a branch or service station, can telephone or wire the nearest branch and a service man is sent at on charge to the truck owner. It is stated that in the majority of cases the trouble can be corrected on the spot by the service man. In the case of damaged cell it does not necessitate laying up the truck for even with a few cells damaged the battery can be operated with these cells cut out as the voltage per cell is so low and number of cells so large that the truck can be operated without the damaged members.

In addition to rendering battery service the service men and inspectors being familiar with the constructional details of the electric trucks make repairs and adjustments to motors, controllers, wiring, meters, charging equipment, etc.

Such is the service which has been developed and is being rendered to users of electric trucks.

Liberal Battery Guarantee

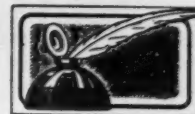
Next is the subject of guarantees. The leading truck battery makers give a broad guarantee. The maximum is 10 years and aside from the conventional time element as affecting material and workmanship, there is written into the guarantee a sliding scale of replacement prices which are liberal. In brief the purchaser is assured that up to and within 10 years that his battery will deliver a definite rated capacity and if within that time it does not it will be replaced at a reasonable cost. For example, after three years of service a replacement is made on the basis of a 50 per cent allowance.

Marked improvement has been made in simple charging equipment and in many instances the truck owners find that it is profitable to install their own equipment. Charging service is on a higher plane than formerly in the electric truck field for central service stations are co-operating with the truck interests in this respect.

*Editor's Note: This is the fifth of a series of articles dealing with the electric truck and its field. The sixth will appear in an early issue.



EDITORIALS



Has It Been Overdone?

SO many trucks have been purchased during recent years on the time payment basis, that many dealers have reached the conclusion that trucks cannot be sold any other way. The dealer feels that he will perhaps lose the order if he does not immediately impress the prospect with the fact that the truck can be purchased on the easiest possible terms. What is the result of the majority of such sales?

Simply that the dealer makes it extremely easy for the prospect to buy a new truck and that all arguments the dealer may advance in respect to construction, quality of materials, adaptability to the prospect's requirements, etc., will fade into insignificance. Besides this an exceptional high allowance has undoubtedly been made on the trade-in. Another truck has been sold to be sure, but where does the dealer get off on profits?

The dealer will argue that he must meet branch competition and the financing plans of some of the stronger companies. He may also say that he is not losing anything by the financing plan as the banks and the financing companies are attending to that. We grant all that—but, supposing that a few customers fail to meet their obligations and the bank becomes the custodian of a few trucks, doesn't that do more harm to the dealer than the loss of a few sales to the long-term questionable credit buyers? Many trucks have been forced on customers just the same as some manufacturers have forced them on the dealer.

When the truck buyer really can't afford to buy a new truck then he should be sold on the idea of having his present machine overhauled. Utilizing long-term paper simply as an expedient to sell trucks is bad business. More trucks could be sold on a cash basis if the industry as a whole would make a determined effort to do so.

This is not intended as a criticism against any financing plan or time payments. Credit is a stimulant to sales and should be extended when necessary, but using this means simply as a leverage to get rid of trucks is not helping to improve the tone of the industry.

Service and the Future

SERVICE is probably one of the most discussed subjects in the industry. Manufacturers who a few years ago considered the subject lightly and who cared little whether their dealers were giving attention to the after sale requirements of the owner have since changed their attitude or—gone out of business. It is no longer a question as to whether or not the manufacturer can shut his eyes to this branch of his business, but the main problem is how can he render the best service at the least cost.

Many dealers who have wondered why their sales have dropped off will find, if they are willing to admit it, that service has been mainly responsible for the sale of a competitive vehicle and not necessarily clever salesmanship and a superior product.

The wise manufacturer no longer questions the advantages of a good dealer's service organization. The problem is rather how he can give service at the least cost to the customer and without loss to himself and the dealer.

Machinery and tools are the answer. The truck service shop must be equipped adequately. Too much equipment is just as bad as not enough. An article on this subject in the next issue will throw some light on the subject—it will give examples of what tools and equipment a truck service station needs.

An encouraging sign is the increasing interest which the engineering department is showing in the service problem. The broad minded engineer is welcoming the closer operation of the service department with his department and, which cannot help but result in saving of time in service work.

The local service association movement has also made considerable headway. The endorsement accorded this movement by the recent N. A. C. C. factory service managers' convention proves that the factories realize the importance of mutual co-operation among the local dealer service managers. Service, after all, must be delivered locally and therefore the factory must first of all study the local problem and extend its best efforts toward helping the individual who is on the firing line.

Don't Miss the 1923 Motor Truck Show—January Number

News of the Trade in Brief

Motor Trucks of Great Value to New England Trade

Just how much New England is relying on the motor truck to solve some of its transportation problems can be gleaned from the weekly letter on the yarn industry, by Frederick B. Macy & Co., New Bedford, Mass.

"Transportation conditions are very exasperating and the freight congestion and embargos have so bedeviled shipments that no yarn consumer is able to figure, even roughly, how long he will have to wait for his yarn unless he buys it nearby and can order delivery by motor truck. Motor transportation in New England is being looked to more and more for yarn deliveries and the distance of the Southern mills from the yarn consumers in New England has made it necessary for the latter to buy their immediate supplies in the Eastern territory."

A TRUCK CHRISTMAS

Christmas mail this year will in many cases not come by the accepted method—the railway—but will be transported by motor trucks. Arrangements have been made by the Postmaster General with the War Department for the use of hundreds of trucks during the holiday season.

Co-ordinators of the eight army corps areas, located at Chicago, Boston, New York, Philadelphia, Atlanta, Columbus, Houston and San Francisco, have been advised to furnish postmasters with available trucks.

Couzens Made Michigan Senator

Senatorial honor has been conferred upon an automobile man. Gov. A. J. Groesbeck recently appointed James Couzens, mayor of Detroit and former Ford executive, as Senator from Michigan to succeed Truman H. Newberry.

Julius Barnes Says Trucks Saved Industry

Utter collapse of agriculture has been saved by the motor vehicle in the last year, according to J. H. Barnes, president of the Transcontinental Development Co.

"If the 2,600 million tons lifted by the railways of this country had not been supplemented by the 1,400 million tons carried by motor vehicles, this last year, there probably would have been an utter collapse," he said.

"It certainly is true that part of the railway channels of today would never have been built, in competition with the more liquid motor transport, if that transport had then been in existence. This suggests, again, the vast potentiality of the motor industry in those sections of the world where vast tonnage is today waiting only reasonable access to market."

SHOWS

- January 6 to 13, 1923—New York, N. Y.** Annual Automobile Show of the N. A. C. C. in Grand Central Palace. Passenger Cars and Accessories. S. A. Miles, Mgr., care of N. A. C. C., 46th St. and Madison Ave.
- January 8 to 11, 1923—New York, N. Y.** Annual Automobile Show and Apparel Style Show at Madison Square Garden. William H. Wellman, Mgr., care Madison Square Garden.
- January 8 to 13, 1923—New York, N. Y.** 2nd annual body builders' show at the 12th Regiment Armory, auspices of the Automobile Body Builders' Association.
- January 13 to 20, 1923—Reading, Pa.** 7th annual automobile show, Reading Auto Trade Assn. J. M. Kulbach Garage Bldg. Passenger cars, trucks and accessories. H. C. Lutz, Mgr., 514 Cherry St.
- January 13 to 22, 1923—Oakland, Calif.** Fifth annual show, Motor Car Dealers' Division of Alameda County Auto Trade Assn., Civic Auditorium. Passenger cars, trucks, tractors and accessories. Robert W. Martland, Mgr., 47 Pacific Bldg.
- January 15 to 19, 1923—Chicago, Ill.** 14th National Good Roads Show of American Road Builders' Association, Coliseum.
- January 16 to 20, 1923—Hudson, N. Y.** 3rd annual show, auspices of Co. M., Hudson State Armory. Passenger cars, trucks, tractors and accessories. Jas. J. Callahan, Mgr., P. O. Box 1186, Pittsfield, Mass.
- January 20 to 27, 1923—Milwaukee, Wis.** 15th annual show, Milwaukee Automotive Dealers' Association, Auditorium. Passenger cars, trucks, tractors and accessories. Bart J. Ruddle, 316 Brumder Bldg.
- January 27 to February 3, 1923—Chicago, Ill.** Annual Automobile Show of the N. A. C. C. in the Coliseum and 1st Regt. Armory. S. A. Miles, Mgr., care of N. A. C. C., 46th St. and Madison Ave., New York City.
- February 3 to 10, 1923—Troy, N. Y.** 9th annual automobile show, auspices of Troy Used Car Sales Corp., New State Armory (60,000 sq. ft.). Passenger cars, trucks, tractors and accessories. Frank M. Baucaus, Mgr., 155 River St.
- February 3 to 10, 1923—Minneapolis, Minn.** 16th annual automobile show, auspices Minneapolis Automotive Trade Assn. Passenger cars, trucks, tractors, accessories. W. R. Wilmot, Mgr., 709 Andrus Bldg.
- February 5 to 10, 1923—Charlotte, N. C.** 3rd annual show of Charlotte Automotive Trade Assn., Carolinas Exposition Bldg. Passenger cars, trucks and accessories.
- February 5 to 10, 1923—Winnipeg, Canada.** Annual Automobile show, auspices of Winnipeg Motor Trades Assn., at Minto Barracks, Automobiles and accessories. A. C. Emmett, Secy., 202 Scott Block, Winnipeg.
- February 5 to 10, 1923—Winnipeg, Canada.** 3rd annual automotive equipment show, auspices of Western Canada Automotive Equipment Assn. W. L. Williams, Secy., Box 3164, Winnipeg.
- February 5 to 11, 1923—Toledo, O.** Annual show of Toledo Auto Shows Co., Terminal Auditorium. H. V. Buelow, Mgr.

Coming Events

- February 12 to 17, 1923—St. Louis, Mo.** 16th annual show auspices of St. Louis Automobile Dealers' Assn. Passenger cars, trucks, and accessories. Robert E. Lee, Mgr., 3124 Locust St.
- February 12 to 19, 1923—Portland, Ore.** 14th annual show of Automobile Dealers' Association of Portland, Inc. Municipal Auditorium (36,000 sq. ft.). Passenger cars, trucks, tractors and accessories. Ralph J. Staehli, 424 Henry Bldg.
- February 16 to 26, 1923—San Bernardino, Calif.** Automobile exhibit in connection with 13th annual National Orange Show. Tent. Passenger cars, trucks, tractors, and accessories. R. H. Mack, Mgr., 215 Chamber of Commerce Bldg.
- February 17 to 22, 1923—New York, N. Y.** Universal Exposition of Inventions and Patents, auspices Universal Patent Exposition Corp., Grand Central Palace, Exec. Offices, World's Tower Bldg., 110 40th St.
- February 17 to 24, 1923—Akron, Ohio.** 9th annual show of the Akron Automobile Exhibition Co., Central Garage (45,000 sq. ft.). Passenger cars, trucks, tractors, accessories. E. T. Jones, Mgr., 1091 W. Exchange.
- February 17 to 24, 1923—San Francisco, Cal.** 7th annual automobile show, San Francisco Motor Car Dealers' Association. Exposition Auditorium. Passenger cars, trucks, tractors and accessories. G. A. Wahlgreen, 215 Humboldt Bank Bldg.
- February 20 to 24, 1923—Deadwood, S. D.** 11th annual Black Hills Auto Show, Deadwood Business Club, Auditorium. Passenger cars, trucks, tractors, accessories and radio. F. R. Baldwin, Mgr.
- February 21 to 24, 1923—Trenton, N. J.** 8th annual show, Trenton Automobile Dealers' Assn., 2nd Regt. Armory. Passenger cars, trucks and accessories. Frederick Petry, Jr., W. State and Willow Sts.
- February 24 to March 3, 1923—Brooklyn, N. Y.** Annual automobile show of the Brooklyn Motor Vehicle Dealers' Assn., Inc., 23rd Regt. Armory. Ralph Ebbert, Exec. Secy.
- February 26 to March 3, 1923—Omaha, Nebr.** 18th annual show at Omaha Automobile Trade Assn., Inc. Municipal Auditorium. Passenger cars, trucks and accessories. A. B. Waugh, Mgr., 2051 Farnam St.
- February 26 to March 3, 1923—Syracuse, N. Y.** 15th annual show at State Armory (43,000 sq. ft.). Passenger cars, trucks and accessories. Howard H. Smith, Mgr., 701 Eckel Bldg.
- March, 1923—Portland, Me.** 10th annual show, Portland Automobile Dealers' Assn. Exposition Bldg. (46,000 sq. ft.). Passenger cars, trucks, tractors and accessories. Howard B. Chandler, Mgr., 3 Park Ave.

- March 10 to 17, 1923—Boston, Mass.** Annual show at the Mechanics' Bldg., auspices of Boston Automobile Dealers' Assn. Passenger cars, trucks and accessories. Chester I. Campbell, Mgr.
- March 10 to 17, 1923—Newark, N. J.** Annual automobile show of the Newark Auto Trade Assn. Claude E. Holgate, Mgr.

CONVENTIONS

- Chicago, Ill., January 15 to 19, 1923—13th American Good Roads Congress and 14th National Good Roads Show, American Road Builders' Association at Congress Hotel and the Coliseum.**
- Chicago, Ill., January 31, 1923—Meeting and dinner of the Society of Automotive Engineers, Congress Hotel.**
- Corpus Christi, Texas, March, 1923—Annual convention of the Texas Automotive Dealers' Assn., W. A. Williamson, Mgr., 104 Gunter Hotel, San Antonio.**
- Davenport, Iowa, January, 1923—Meeting of the Midwest Regrinders' Association.**
- Great Falls, Mont., May, 1923—Annual meeting of the Montana Automobile Distributors' Association, Hotel Rainbow. L. E. Jones, Secy.**
- New York, N. Y., January 10, 1923—Open meeting of the Metropolitan Jobbers of the A. E. A. Robert L. Sim, Chm., 246 W. 65th St.**
- New York, N. Y., January 9 to 12, 1922—Annual meeting of the Society of Automotive Engineers, Engineering Society Bldg., 29 West 39th St.**
- New York, N. Y., May 7 to 10, 1923—Annual convention of Chamber of Commerce of the United States.**
- Olympia, Wash., July, 1923—Annual convention of Washington Automotive Trade Association, Olympian Hotel.**
- Providence, R. I., April 5, 1923—Annual election of officers, Rhode Island Automobile Dealers' Assn. Ralph P. Lord, Secy., 617 Industrial Trust Bldg., Providence.**
- Quincy, Ill., March 3, 1923—Fourth annual convention of the Illinois Automotive Trade Assn., F. C. Zillman, Mgr., 212 Lehmann Bldg., Peoria, Ill.**
- Richmond, Va., March 8, 1923—Annual convention of Virginia Automobile Dealers' Assn., Murphy Hotel.**
- Salt Lake City, Utah, February, 1923—Annual meeting of Intermountain Automotive Trades Association, Carl L. Snow, Mgr., Salt Lake City.**
- Topeka, Kansas, January 15, 1923—Convention of Automobile Trade Association of Kansas. Phil E. Zimmerman, Topeka.**

FOREIGN EVENTS

- Brussels, Belgium, January 13 to 24, 1923—16th annual Automobile and Cycle Exposition at Palais du Cinquantenaire. Passenger cars, trucks, tractors, accessories, etc.**
- Rome, Italy, March 19 to 24, 1923—General meeting, International Chamber of Commerce.**
- Seville, Spain, May, 1923—International Road Congress.**

Service Equipment Associates Formed at Chicago

New Organization Will Promote Intensive Merchandising of Shop Equipment

An organization known as the Service Equipment Associates, whose object will be the more intensive merchandising of shop equipment and the dissemination of service equipment knowledge, working in harmony with, and carrying on more extensively the activities in better merchandising begun by the Automotive Equipment Association, was effected at Chicago, November 17. Service Equipment Associates is the outgrowth of an informal combination of equipment manufacturers whose purpose it was to educate the dealer and garagemen to the advantages of proper shop equipment, by systematic advertising and informative publicity.

The organization took shape at a dinner held at the Congress Hotel, during the A. E. A. exhibit, the following manufacturer representative being in attendance: C. J. Buckwalter, president, American Bureau of Engineering; S. Duncan Black, president, and G. W. Brogan, advertising manager, Black & Decker Mfg. Co.; M. T. Rogers, president, Burton Rogers Co.; J. H. Hazley, sales manager, Jacobs Mfg. Co.; Robt. E. Manley, president, and H. M. Smith, sales manager, Manley Manufacturing Co.; S. V. Wood, president, and C. E. Imes, secretary and treasurer, Mid-West Manufacturing Co.; Frank Chase, sales manager and treasurer, Frank Mossberg Co.; Joseph Weidenhoff, proprietor, Joseph Weidenhoff, and C. F. Wright, secretary and treasurer, and W. F. Wright, vice-president Wright Mfg. Co.

The guest representatives present were: A. B. Jenkins, district manager Brunner Mfg. Company; W. C. Hecker, vice-president, Curtis Pneumatic Machinery Co.; Willard Walker, president, and J. H. Cooper, eastern sales manager, Walker Mfg. Co.; Fred S. Durham, vice-president and treasurer, Bonney Forge & Tool Works; J. F. Weller, president, Kellogg Manufacturing Co. and Louis Schwab, general manager, Stevens & Co.

The last three named companies were elected to membership in the group. The business meeting which headed the program resulted in the election of an informal governing commission of three men, each to serve one, two and three years, respectively: G. W. Brogan, 3 yrs.; S. V. Wood, 2 yrs., and Chas. F. Hodgson, 1 yr. Four meetings are to be held a year, two at the Automotive Equipment Association conventions and the other two between these conventions. Admission to the Service Equipment Associates will be by invitation.

William Webster, commissioner of the A. E. A., and Ray Sherman, merchandising director, were the guests of honor; both delivered excellent addresses pointing out the field for such a movement as

the one being sponsored by the new body.

Through the efforts of the temporary combination of service equipment manufacturers, the need for efficiency equipped service shops has been presented to the trade in such a manner that dealers are now paying more attention to a heretofore neglected factor. While the A. E. A. has carried on its merchandising campaign on a stupendous scale, the service-equipment end has been a specialized factor, which, due to the many ramifications of the general campaign, did not permit intensive specialized campaigns. For this reason Service Equipment Associates will fit into the scheme nicely and render invaluable service to the industry as a whole.

Reeves Expects Motor Transport Growth for 1923

2,400,000 Production of 1922 Sets Mark 10 Per Cent Higher Than 1920 Record

"The demand for individual motor transportation continues at a record pace," said Alfred Reeves, general manager of the National Automobile Chamber of Commerce, on his return from a visit to a number of motor car and motor truck plants in Ohio, Indiana, Illinois, and Michigan. "October and November supplied bigger shipments than ever were recorded for the same period of any previous year.

"The same need for motor vehicles which created a record output of 2,400,000 units in 1922, or 10 per cent better than the previous high mark of 1920, will be as keenly felt in 1923. Further, in 1923 more persons will be able to purchase the needed transportation because farming conditions will be better, exports are already showing a turn upward, and the closed car output which was only 10 per cent of the total in 1919 is running as high as 25 to 30 per cent today.

"In fact, the difficulty of getting enough closed bodies to meet the demand will be one of the limiting factors in 1923. It is true, that there are many in the market who prefer the open type of vehicle, but the trend of favor is toward the enclosed models.

"The continued growth and record output of the industry in 1922 which has astounded some, may be accounted for by the fact that motor transport meets a fundamental human need for individual means of travel, and by the fact that manufacturers readjusted prices promptly and directly to the ultimate consumer, so that motor vehicle values today are the best that have ever been offered.

"Motor truck makers are expecting a better outlook for 1923. With improved business conditions there will be greater movement of freight and consequent demand for motor trucks in the short haul field."

A. E. A. to Continue Its Merchandising Campaign Plans

Convention and Show at Chicago is Very Successful Event; Next Meeting to be Held in New Hampshire

The latest step in the Merchandising Campaign, sponsored by the Automotive Equipment Association, actively directed by Ray W. Sherman, merchandising director, is to be known as the "One Salesman; One Dealer; One Million" plan as introduced at the A. E. A. convention at Chicago, November 13 to 18. It is stated that one million dollars of business can be added to the automotive equipment industry in six months if every sales executive takes an earnest part in this plan.

By the plan each jobber promises that he will insist upon each one of his salesmen in the field selecting at least one retail automotive equipment dealer on his route for intensive merchandising development, and will concentrate on that man as much as possible during the year, aiding him and educating him to the very best of his ability, so that this one retailer, at least, shall be a better merchandiser at the end of the year than he was at the beginning.

The convention elected the following new officers: Nelson H. Oliver, president; William E. Wissler, vice president; Earl V. Hennecke, chairman of board of directors; A. H. Bowman, Wallace G. Page, R. J. Cahall, G. H. Southard, Jr., Percival Stern, F. D. Caswell, C. C. Hillis, N. Field Osborn, board of directors.

The association voted to hold its mid-summer convention June 25 to July 1, 1923, at the Balsam Hotel, Dixville Notch, New Hampshire. This is in line with policy of the association to alternate its summer meetings East and West.

The following new members were received into association at this meeting.

Manufacturers

B. G. Corporation, New York, N. Y.; Burgess-Norton Mfg. Co., Geneva, Ill.; Carter Carburetor Co., St. Louis, Mo.; Gladiator Mfg. Co., Auburn, Ind.; Grigsby-Grunow-Hinds Co., Chicago, Ill.; Kay-Bee Mfg. Co., Los Angeles, Calif.; Keasbey & Mattison Co., Ambler, Pa.; Parker & Waterman Mfg. Co., Los Angeles, Calif.; Perfection Gear Co., Chicago, Ill.; Rub-Tex Products, Inc., Indianapolis, Ind.; A. Schrader's Sons, Inc., Brooklyn, N. Y.; The Sunderland Co., Warsaw, Ind.; The Toledo Steel Products Co., Toledo, Ohio; Williams Bros. Aircraft Corp., San Francisco, Calif.

Jobbers

Evans Rubber & Supply Co., Inc., Fresno, Calif.; James Martin Corporation, New York, N. Y.; Mossman-Yarnelle Co., Fort Wayne, Ind.; Orgill Bros. & Co., Memphis, Tenn.; Perry & Sherman, Utica, N. Y.; The Ready Auto Supply Co., Inc., Brooklyn, N. Y.; The Walter Tips Co., Austin, Texas; Vermont Hardware Co., Burlington, Vt.

Big Merger Consummated by Two Large Truck Companies

Consolidation to be Known as Bessemer-American Motors Corporation

It is announced that plans for a merger of the American Motors Corporation of Plainfield, New Jersey and the Bessemer Motor Truck Company, of Grove City and Philadelphia, Pa., have been completed and await only the approval of stockholders to become effective. The consolidated company will be known as the Bessemer-American Motors Corporation, and will have a capitalization of \$2,000,000 of 8 per cent Participating Preferred Stock and 200,000 shares of Common Stock with assets in excess of \$3,000,000. It is understood that the same interests that have been identified heretofore with the management of the two companies will continue in charge of operations but that there will be a general consolidation of activities in both organizations with a consequent reduction in expense and increase in efficiency and economy.

The Bessemer Motor Truck Company is one of the old-line truck manufacturing concerns having been established more than ten years ago and puts out a complete line of commercial cars in one ton, 1½ ton, 2½ ton and 4 ton sizes. Its product is widely distributed and the company has an excellent record. The company maintains two plants located in Grove City and Philadelphia but following the merger it is stated that operations will be consolidated at the Philadelphia plant.

The American Motors Corporation manufacturers the American Balanced Six and has more than 4,000 cars on the road.

A week after the announcement of the consolidation, Ralph D. Mock was appointed general manager of the Bessemer Motor Truck Co. He is known in the industry through his service as vice-president of the Hydraulic Steel Co., of Cleveland and also through his activities in the M. A. M. A.

New Classification Needed for Trucks, Says Fenner

Truck overloading and motor vehicle legislation formed the points of attack of the speech of David C. Fenner, manager of the Public Works Department of Mack Trucks, Inc., delivered at the convention of the north central division of the National Highway Traffic Association held at Grand Rapids, Mich.

"We are handicapped," he said, "by lack of standards of truck rating and classification, so no comparison can be used. A motor truck is a carrying tool, not necessarily a measuring tool. It should be in the same general classification as the shovel and wheelbarrow, and not with the quart, peck and bushel basket. Truck overloading is due in part to the improper basis of rating and classifying the motor

truck chassis in terms of manufacturer's rated pay load capacity. The user soon learns that this does not mean anything."

Other interesting and instructive addresses were delivered by Roy D. Chapin, president of the Hudson Motor Car Co. and by David Beecroft of the Class Journal Co.

Fred Glover Made Head of Timken-Detroit Axle Company

**Succeeds A. R. Demory as President of
Well-Known Manufacturer**

Following the recent announcement of the resignation of A. R. Demory from the presidency of the Timken-Detroit Axle Company, effective December 2, customers of the company and the trade in general will be interested in learning of the appointment of Fred Glover as president. The only other change made is that of chairman of the board of directors, to which position H. W. Alden has been appointed.

Mr. Glover became associated with the Timken organization in July 1919, as vice-president and general manager, coming from Washington where he had been chief of the Motor Transport Service and later chief of the Motors and Vehicle Division, P. S. & T., in charge of procuring all automotive equipment for the army. Prior to his work in Washington, he was vice-president and general manager of the Gas Traction Co., of Minneapolis, from 1907 to 1912. When this company sold its holdings to the Emerson-Brantingham Co., Mr. Glover joined the new organization as vice-president, remaining with it until 1918 when he was called to Washington.

Fred Glover's ability in efficiently handling the settlement claims of hundreds of passenger car and truck manufacturers at the close of the war is well known throughout the industry and his executive ability and business training ability fit him to direct the large and increasing business of the Timken Company.

H. W. Alden, who is well-known throughout the trade and the engineering profession, has been with the Timken Co. for seventeen years and in the motor car field since 1895. Since the organization of the Timken-Detroit Axle Co., in 1909, he has been in complete charge of design and engineering and to his ability and foresight is due much credit for the success of the Timken product.

Executives of the Timken Co. express confidence in the future of the automotive industry. The actual orders already received by the Timken-Detroit Axle Co. from both passenger car and commercial car builders, together with several new contracts just closed shows every indication of an increased volume of business for 1923. While no one can forecast the future with absolute accuracy, the Timken Company anticipates a volume upwards of \$24,000,000 during the coming year.

Campbell Transmission Has Entered the French Field

**Company Formed in Paris to Push the
Sale of American Product**

L. J. Campbell, of the Campbell Transmission Company, of Buchanan, has just returned from a three months business trip in France.

Honore Dufore, a member of the French High Commission who was inspector of steel in the United States during the war for the French Government, became acquainted with the Campbell transmission, and on his return to France after the armistice was signed, took a sample transmission with him. After two years testing of this transmission in France it was adopted by the Philips Company and has been used as standard equipment on their 1922 cars. This demonstrated to the other manufacturers the advantage of the Campbell transmission and they designed transmissions for their cars embodying the Campbell principle and made tests; after which they requested Mr. Campbell to come to France.

Upon his arrival in Paris he conferred with the interested parties and it became necessary to organize a Company under the French law which would have full power to manufacture and to license other manufacturers. This company is known as the Societe francaise des changements de Campbell, and capitalized at 2,280,000 francs, all of which was immediately subscribed by bankers and industrial men of Lyons and Paris, who at once purchased a fully equipped factory and secured as general manager M. Barron. He has been connected with the automobile industry since its beginning, and has been chief engineer for the Rochet-Schneider and factory manager for other automobile manufacturers, and is considered one of the best authorities in France.

Gordon Lee Resigns From Automobile Division

Inability of the Government to compete with private industries in the matter of salary has cost Secretary Hoover of the Department of Commerce one of his most valuable and active assistants, Gordon Lee, Chief of the Automotive Division of the Bureau of Foreign and Domestic Commerce, whose resignation becomes effective Dec. 15. Mr. Lee is to take up the work of directing foreign sales of the Yellow Cab Manufacturing Company of Chicago, Illinois, assuming those duties the first of the coming year.

Secretary Hoover readily admitted his regret over losing Mr. Lee, but stated that it was impossible for him to retain men in the Government service when private industries are willing to pay them many times the salary he is able to offer.

Mr. Lee came to the Department of Commerce for the specific purpose of organizing the Automotive Division more than a year ago, having been selected by the N. A. C. C. to develop the foreign activities of the automotive industry.

Cleveland Planning Commercial Car Show

Trucks, tractors, motor buses, trailers and every sort of commercial vehicles will be included in a special exhibition which is to be held in Cleveland in conjunction with that city's twenty-second annual automobile show, January 20 to 27.

This show will be held in Central Armory, a building with approximately 25,000 sq. ft. available for exhibition purposes on its one floor and which is directly across the street from the big new municipal auditorium which will house the automobile show proper.

Representatives of interests associated with the truck, bus, tractor and commercial vehicle trade in Cleveland, eager for an exhibition of this kind, have endorsed the project and are wholeheartedly behind it.

The exhibition will be conducted by the Cleveland Automobile Manufacturers' and Dealers' Association, with Herbert Buckman, manager of this association in charge. This association is also promoting the annual automobile show.

At the meeting of those interested in these particular branches of the trade, opinions were expressed that the coming year holds forth promise of greatly increased business in the commercial vehicle business and that an exhibition as proposed would do much to stimulate this trade in northern Ohio.

Under the plans made, one ticket will admit a visitor to both shows, and this also will tend to increase the attendance at the business vehicle show. Special decorations and special musical programs will be offered in the armory exhibition.

Florida Association Undergoes Reorganization

The Florida Automobile Dealers' Association, at their decent meeting at Orlando, Fla., decided to reorganize the association on a new basis. Under the new plan membership in the state association is to be secured only through membership in local associations in the various towns and cities.

"Gus" Johnson, for many years Overland branch manager at Jacksonville, was named as temporary president to await the meeting of the board and the election of permanent officers.

New York Jobbers to Entertain During Show

Metropolitan jobbers of the Automotive Equipment Association are to be the hosts to retail automobile men a day during the New York show. Extensive plans are being evolved to furnish an entertaining as well as an instructive program. Ray Sherman, of the A. E. A., has been secured as a speaker. The tentative date set is January 10. Tickets can be secured from Robert L. Sim, of Whittemore Sim Co., 246 W. 65th St., New York.

British Truck Market Not Much Improved

There were 962,000 motor vehicles, the licenses of which were current on August 31, in Great Britain, according to the London Times Trade Supplement. This figure includes approximately 314,000 cars taxed on horsepower, 377,000 cycles, 150,000 commercial goods vehicles, and 77,000 motor hackneys. The number of vehicles exempt from taxation, such as motor fire engines, was 11,065.

The situation regarding the motor truck market has not improved greatly from the position which prevailed a few months ago, says Commercial Attache Tower. The market for this type of motor vehicles has been very adversely affected by the number of surplus war trucks offered, not only in Great Britain but also in some Continental countries and in the United States. This condition still prevails to some extent but should change for the better in the near future, as the life of these trucks now in use will not be much longer.

Time-Payment Plan Formed by Milton Wagon Co.

The Milburn Wagon Co., manufacturer of Milburn electric trucks, has announced two new time-payment plans whereby a buyer can purchase Milburn trucks on a part cash and part time basis. One embraces payment over a 12-month period, the second, payment over 21 months. Payments are made as follows: when order is signed, 10 per cent; when truck is delivered, 15 per cent; balance in monthly installments covering 12 or 21 months. Interest at 6 per cent per annum on unpaid balances is charged plus an amount varying from \$75 to \$220 to cover the cost of time financing and insurance.

Forbes Succeeds Clifton in Pierce-Arrow Co.

Myron E. Forbes is announced as the successor to Col. Charles Clifton, as president of the Pierce-Arrow Motor Car Co., Buffalo, N. Y. Col. Clifton, however, remains as chairman of the board of directors. Mr. Forbes has been treasurer of the company since 1919, and for the past year, vice-president and chief executive under the chairman of the board. S. O. Fellows, who was recently made controller, succeeds Mr. Forbes as treasurer.

Acason Truck Now Built in Detroit

The Acason Motor Truck Co., of Wyandotte, Mich., which recently went out of business and had all its affairs closed, has been re-organized under the name of the Acason Company, 6401 Miller Ave., Detroit, under the direction of H. W. Acason.

The company will continue the manufacture of Acason trucks in Detroit, exact details of the models, etc., to appear later.

Pennsylvania Dealers Work in Harmony With State Officials

What the Pennsylvania Automotive Association lacked in age—it is one of our infant state associations—it made up in enthusiasm, as exemplified in the first annual convention of this organization held at the Capitol Building, Harrisburg, November 20 and 21. Over one hundred representatives were in attendance.

The session accented the co-operation between the State Government and the State automobile industry, particularly through the speeches of E. E. Beidleman, lieutenant-governor of Pennsylvania, who made the address of welcome; Geo. H. Byles, assistant state highway commissioner on "Highway Past and Present"; Ben G. Eynon, Registrar of Motor Vehicles, on "Evils of the Highway License Bureau"; and Dr. J. M. Thomas, president of State College, on "Education for an Age of Machinery."

The industry was represented by C. A. Vane, general manager of the N. A. D. A.; Ray Sherman, merchandising director of the A. E. A. and A. R. Kroh, of Akron. G. Lynn Sumner, director of advertising, International Correspondence Schools, Scranton, made an instructive address on "Getting Back to Salesmanship." George G. McFarland, president of the P. A. A., in outlining the activities of the association, urged close attention to legislation during the coming winter and suggested discussion of personal examination for applications for license; that refiners and all dealers pay the gasoline tax and a liberal interpretation of the dealers' tag law.

Election of officers resulted as follows: George G. McFarland, president (re-elected); J. Barton Arbuckle, Erie, C. T. Satchell, Allentown, Jack Leopold, Johnstown, George A. Hoeveler, Pittsburgh, and O. E. Conrad, Scranton, vice-presidents; R. W. Shriner, Harrisburg, secretary; and E. A. Clark, York, treasurer.

Yellow Cab to Build Large Addition

A expenditure of approximately \$300,000 for the construction of an additional plant for the production of yellow cabs has been authorized by directors of the Yellow Cab Manufacturing Co., in Chicago. Work on the new building which will adjoin the present plant will be started immediately. The new structure will be a duplicate of the present building and will have a capacity of between 45 and 50 cabs a day.

Ford to Greatly Increase Production Next Spring

Production figures for the month of October for the Ford Motor Co., totaled 121,765 passenger cars and trucks which is 32,000 more than any previous October. The number of unfilled orders on hand at the Ford Co., makes it imperative that production be increased by next Spring. A recent announcement states that 7000 to 8000 cars daily may be produced against 5380, the company's record day.

C. W. Bassett, formerly sales engineer of the Truck Wheel Division, Bethlehem Steel Co., has recently accepted a position with the Elevator Supplies Co., Inc., where he will have charge of the special mechanical development work.

E. G. Buckwell, after 23 years of active and faithful service with the Cleveland Twist Drill Co., Cleveland, has resigned as secretary and sales manager, but will remain as a director of the company. **W. E. Caldwell**, former assistant sales manager, will succeed him.

W. A. Casey has been announced as truck sales manager of the Detroit branch of the Packard Motor Car Co., to fill the vacancy caused by the retirement of C. C. Spenser. Mr. Casey has been with the Packard Co. for nine years.

Col. Charles Clifton, president of the N. A. C. C., has been made a member of the Legion of Honor of France. The citation states that the honor was bestowed for his work on behalf of the orphan children of France.

William S. Davis, Jr., formerly in sales promotion activities in New York and other branches of the U. S. Rubber Co., has joined the United Motors Service at the general offices in Detroit, and will be engaged in sales promotion work.

F. W. Gargett has recently become associated with the Indiana Truck Corp., Marion, Ind., in the capacity of assistant to the president, supervising the branches and subsidiaries of the corporation. He was formerly with the Transport Truck Co., in the capacity of factory manager.

Ray Harroun, former International race champion, who has been for several years prominent as an automotive engineer, has joined the organization of the Marvel Carburetor Co., Flint, Mich., with combined responsibilities in executive engineering and sales.

J. Armory Haskell has resigned as president of the General Motors Export Co. He has been president since February 13, 1918. **James D. Mooney** has been elected to succeed him.

William Holt, for 17 years connected with the Manufacturers Supply Co., of Philadelphia, has gone into business for himself as the Cooper Tire & Battery Co., distributing Cooper tires and batteries at 1338 Cherry St.

H. Belden Joseph has been made sales manager of Strauss & Co., Inc., New York City sign makers. He was at one time advertising manager of the Kelly-Springfield Tire Co.

William Rafferty has been appointed receiver for the Syracuse Rubber Co. The application was not opposed by the company, which claims assets \$360,000 in excess of liabilities, but admits inability to borrow the necessary money to continue business.

W. W. Sayers has been promoted to the position of chief engineer of the Link-Belt Company's Philadelphia Works and Eastern operations. His headquarters will be at Philadelphia.

George H. Sheldon has been appointed general manager of Thresher Service, New York City. He has had wide experience in advertising work, having been with the firm of Snodgrass & Gayness, Inc., for a number of years.

T. W. Siemon, vice-president in charge of the Drop Forge Division of the Union Switch & Signal Co., Swissvale, Pa., has resigned from that company. **Finley L. Walton** has been appointed general sales manager of this division.

William B. Staley, proprietor of Staley's Garage, 11 W. Eager St., Baltimore, Md., has been appointed distributor of Traffic trucks, made by the Traffic Motor Truck Corp., St. Louis, Mo., in the Baltimore territory.

T. J. Turley, well known implement dealer and jobber at Owensboro, Ky., has become associated with the J. I. Case Plow Works Co., as division manager of their Southeast Division.

Harry S. Whitehair, well known throughout the truck industry, has been appointed to the national sales division of the General Motors Truck Co., of Pontiac, Mich. He will devote his time to sales to large fleet owners in all sections of the country, paying special attention to the companies which have headquarters outside of New York and Chicago.

Walter H. Woods has been made sales engineer for the Detroit territory of the Motor Bearings Division, Hyatt Roller Bearing Co., Detroit. Mr. Woods has had excellent training coupled with years of experience in the selling of mechanical products.

Trade Changes

The Chanslor & Lyon Co., largest jobber on the Pacific Coast, will occupy its new four-story building at Ellis and Polk Sts., San Francisco, about January 1. The plant is to be modern in every detail.

The Gibb Instrument Co., of Detroit, manufacturer of electric welding equipment, announces the removal of its plant and offices to Bay City, Mich. The move will provide greatly increased manufacturing facilities to take care of the rapidly increasing business.

The Micro Machine Co. is the new name of the B. L. Schmidt Co., Davenport, Iowa, the change in name having been made to more closely link the manufacturer with the name of the product. The company recently moved to a new factory building.



C. Monroe Smith

Who has assumed the role of business manager of the COMMERCIAL CAR JOURNAL. Mr. Smith, who was a former resident of Chicago, is a graduate of the University of Pennsylvania, '03, where he was active in athletics. For six years he was with Manning, Maxwell & Moore, Inc., selling machine tools and brass goods to the passenger car and truck factories. He began his CHILTON COMPANY career as a solicitor for the COMMERCIAL CAR JOURNAL in the Eastern territory including Ohio and later became advertising manager. Mr. Smith then became Eastern manager of the CHILTON SERVICE and Eastern manager of all this company's publications. Having been with the CHILTON COMPANY since the inception of the COMMERCIAL CAR JOURNAL he is well grounded in its policies and will continue to carry out the principles that have placed this journal as the leader in its field.

The Torsion Test Piston Ring Corp. has discontinued its executive offices at New York and has been established at 571 Broad St., Newark, N. J. The move will place the offices in closer contact with the factory at Newark.

The Paul Rubber Co., Salisbury, N. C., which has taken over the output of the Tire-meter Valve Corp., of America, Charleston, W. Va., is now in a position to supply dealers, jobbers, distributors and tire manufacturers with the Tiremeter valve.

The Black & Decker Mfg. Co. has re-located its Philadelphia branch office and service station at 824 North Broad St., the new quarters affording more commodious and up-to-date accommodations. The branch was formerly at 318 N. Broad St.

MacManus Incorporated, of Detroit, has been appointed as advertising counsel of the Champion Spark Plug Co., of Toledo.

The Selden Truck Corp. executive offices at Rochester, N. Y., have been combined with the factory offices, located at the plant. The Selden Corp. is now a division of the Industrial Motors Corp.

The American Gear Co., of Chicago, has opened a factory branch at 4475 Cass Ave., in Detroit. O. T. Moore is manager of the branch.

The Electric Material Co., Hinckley Bldg., Seattle, Wash., has been appointed agent for the Roller-Smith Co., 233 Broadway, New York City, in the state of Washington and parts of Oregon and Idaho.

The L. H. Gilmer Co., Tacony, Pa., is building a new unit to its present factory that will afford 25,000 sq. ft. of floor space. Gilmer's growing business has necessitated the new building, which will be finished in March.

Literature

The Alvord Reamer & Tool Co., Millersburg, Pa., has issued a loose-leaf catalog of the tools which the company produces for automotive service stations. Catalog No. 6 covering all the products of the company is of convenient shape and is handily arranged.

Wm. H. Rankin Co., of Chicago, advertising, has prepared a commendable little booklet entitled "How National Advertising Gives You the Benefit of Co-Operative Buying," written by H. A. Groth, treasurer of the company. The subject of educating the ultimate consumer to the advantages of buying advertised products is treated in an interesting manner. The article was originally printed in Printers' Ink.

Making and Saving Profits, is an attractive little catalog-manual published by the Comfort Printing Specialty Co., St. Louis, Mo., whose aim is to aid in the success of retail automobile dealers, garages and repair shops, by the introduction of standardized tags, forms and office records printed by the company which will make shop maintenance and operation accurate and profitable. Beside the illustrations of the tags and forms, there are several useful chapters on shop systems.

The Heil Co., Milwaukee, Wis., has issued its new Hydro Hoist's Parts List No. 2. The catalog describes the company's power take-off assemblies which are designed to fit any model of American truck. The list also contains information on how to mount the Hydro Hoists, also how to operate, use and care for them. The catalog has been prepared with great care and is complete in every detail.



SERVICE AND REPAIR DEPARTMENTS



Factory Service Men Endorse Local Service Associations

Truck Factories Well Represented. Some See Need of Lower List Prices on Replacement Parts. Less Criticism of the Independent Repair Shop. Flat-Rate Plan Making Headway

By C. P. SHATTUCK

THREE and one-half years ago the factory service managers of the truck and passenger car industry held their first convention at Detroit under the auspices of the National Automobile Chamber of Commerce. While it was the first national service convention it is only fair to state that the first steps towards organized service began when the service heads of the New York dealers formed the Automotive Service Association of New York. Shortly after Newark, N. J., and Brooklyn, N. Y., organized service associations. Later other cities followed.

It was apparent to those in touch with the industry that the local associations could not develop service nationally although there was talk of a national organization of service associations. The task of organizing was too great, so the National Automobile Chamber of Commerce got in back of the service movement and the conventions of the factory service managers followed. This swung the factories in line, not all of them it is true, for there were, and still are some which have not been actively represented at the conventions. This preamble is made to partly explain why greater progress has not been made in service.

Lack of Dealer Interest

The factory service convention held at Chicago, Nov. 14 and 15, was the most successful and best attended to date. A fact which could not be overlooked, however, was the lack of interest shown the

dealer and trade associations on the second day of the program, which called for a discussion on the dealer angle in service. The service committee of the N. A. C. C. extended invitations to the presidents and secretaries of over 300 dealer and trade associations, but less than half a dozen dealer organizations were represented.

The trade associations were sufficiently informed and the object of the meeting was set forth clearly. Perhaps the presidents of the associations were too busy, but paid executives should not have this excuse. Inasmuch as it was clearly pointed out in the announcement, that an effort would be made to show that it was to the dealer interest to promote service associations, it may have been that the trade associations do not desire to be sold. In other words, it appears that the dealer associations are not sold on associations or organizations of their service heads.

Endorse Local Service Associations

In defense of the dealer associations, the alibi is presented, that the dealers have not been sold on the service association. In other words the value of the service association locally has not been correctly merchandised. This brings up the question as to how many factories have endorsed the local service association movement. Some have urged their dealers to at least give it their moral support. Others have endorsed it. And after six conventions the factory service managers have gone on record with a

resolution as approving local service associations and pledging factory support and co-operation. In addition it was the sense of the meeting that a uniform service association emblem, a slogan, "Sign of Good Service," and a code of service ethics should be adopted. These policies and their advantages were outlined by the representative of the Brooklyn association.

Program Well Balanced

The program of the convention was well balanced and the discussion of the subjects brought forth a valuable exchange of data and ideas. There was the best attendance of truck factories to date. The first day was given over to strictly factory subjects, the second to a service association conference which was a three-cornered discussion on service and service associations.

The address of welcome was tendered by Thomas J. Hay, president of the Chicago Trade Association. Then followed H. J. Leonard, vice-president and general manager, Stephens Motor Car Company. His subject, "The Service Manager as a Factor in Building for the Future," was well handled. "Buyers," he said, "are not so much interested in price as they are the satisfaction which comes from quality and service, and while experience seems to demonstrate that price is the biggest factor in getting the initial order, quality and service are the most important factors in securing the repeat orders. The maker who talks of the saturation point is one who is not securing re-

peat orders. I love the man who advises me he has his third, fourth or fifth car of the same make, for I know he is satisfied with both quality and service. Service managers can do more through intelligent administration of service to eliminate the bugaboo of every sales department, sales resistance, than any other factor in the industry. He must be a diplomat and an optimist. In the old days he was the young man who could handle a parts department and show a little profit, but today it is different. There is nothing new in service except manner of administration."

Lower Price List Urged

The speaker described his factory's plan of meetings of the various department heads, including service, the benefits therefrom and how service costs had been reduced by co-operative contact. He also spoke of the sales resistance created by a high list on replacement parts and said that he did not believe that list of the components of a unit should total greater than the list of the unit except on obsolete parts. He also said that the parts manufacturer should realize that his future is closely wrapped up in the success of the automotive manufacturer and should be led to as nearly a realization of the necessity as possible. Parts makers should also discourage sale of parts of the car maker to outside concerns who charge a tremendous differential over what should be charged. This, said the speaker, has grown too prevalent for the good of the industry.

Sections of the report of the pirate parts committee were read, but there was little if any discussion of this subject, which was well thrashed out at previous conventions. After pointing out that the failure of parts other than the genuine to give satisfaction to the owner and how they reflect upon the reputation of the car, the report pointed out that the remedy for pirate parts was a fair price, by truck and car maker, dealer and distributor plus education of the dealer and consumer. It was further stated that most of the replacement or substitute business is going to the outside shops, therefore the dealer must be educated, and he in turn must educate the owner.

The report recommended that manufacturers sell replacements at as low a price as is consistent with the quality of the material and workmanship used. That especially low prices be fixed for the various items that are universally pirated. "We believe it will be necessary to compete on a price basis with these independent makers in order to reduce their market." In addition to the use of a distinguishing mark, the use of wall hangers by dealers, reading, "We supply only genuine parts," was recommended. The report also recommends an advertising campaign to the trade and to the owners.

Less Criticism of Independents

Parts discounts to independents were discussed, and there appeared to be no standard policy. Several factories expecting to service their product in open territories give a discount to independent shops, while others allow their dealers and distributors option as to a discount or none. It was pointed out that the independent shops added a considerable handling charge when not favored with a discount. Some speakers were broad-minded in this matter, pointing out that satisfactory service to the owner

These Answered—Present!

Acme Motor Truck Co.
A. B. Westman, Ser. Mgr.
Amer. LaFrance Fire Eng. Co.
W. L. Wanamaker
Atterbury Motor Car Co.
C. L. Weidrich, Ser. Mgr.
Autocar Co.
B. B. Bachman, Engineer
C. A. Borton, Boston Ser. Mgr.
A. Crosley, Mgr. Parts Dept.
A. B. Cumner, Gen. Ser. Mgr.
Denby Motor Truck Co.
A. R. Osborne, Ser. Mgr.
Dort Motor Car Co.
R. A. Shelly, Ser. Mgr.
Earl Motors, Inc.
J. L. Blyth, Ser. Mgr.
Federal Motor Truck Co.
Geo. H. Dow, Ser. Mgr.
Garford Motor Truck Co.
M. A. McCullough, Ser. Mgr.
International Harvest Co.
H. A. Frick, Br. Mgr.
Kelly Springfield Motor Truck Co.
P. J. Hart, Ser. Mgr.
Milburn Wagon Co.
M. B. Davey, Ser. Mgr.
Nash Motors Co.
E. H. Mahoney, Ser. Dept.
L. L. Virgil, Ser. Mgr.
Olds Motor Works
R. M. Hatfield, Ser. Mgr.
Packard Motor Car Co.
B. R. Horsley, Mgr. Ser. Stores Dept.
H. C. Taylor, Ser. Dept.
Paige-Detroit Motor Car Co.
F. W. Bowen, Ser. Mgr.
Pierce-Arrow Motor Car Co.
C. D. Cowles, Mgr. Parts Dept.
Fred J. Wells, Ser. Mgr.
Reo Motor Car Co.
D. C. Streeter, Parts Mgr.
J. F. Collins, Ser. Mgr.
Q. A. Schacht Motor Truck Co.
B. M. Shay, Ser. Mgr.
Sterling Motor Truck Co.
H. J. Loeb, Ser. Mgr.
Studebaker Corp.
F. R. Gibbs, Ass't Nat'l Ser. Mgr.
A. W. Hunt
F. A. Hurcomb, M & S Dept.
T. K. McCune, Nat'l Ser. Mgr.
Velle Motors Corp.
C. M. Gustine
White Motor Co.
H. C. Marble, Parts Ser. Mgr.
E. D. Power, Staff Ass't Parts Ser. Mgr.
F. H. Stetzel, Ass't Gen. Ser. Mgr.
A. W. Kenerson, Gen. Ser. Dept. (Cleveland)
Willys-Overland Co.
W. R. Webster, Ser. Mgr.
Yellow Cab Mfg. Co.
A. E. McKeever, Ass't Ser. Mgr.

was the paramount issue. There appeared to be less resentment to the independent shop than at former conventions. Among the topics for discussion, and papers, were, "How to Save Transportation Costs by Shipping Parts in Carload Lots of Cars," "How Are Taxable and Non-Taxable Parts Distinguished?", "Boxing Parts for Shipment," and "Overcoming Misrepresentation of Service by Overzealous Salesmen."

The flat rate was on the program, and

it was quite evident from the remarks that it is accepted, although a vote showed that while many were advocating it others were not as yet prepared to sell it to their dealers. It is interesting to note that in one vote none were against it.

Flat Rate Lubrication Next

That the service men are progressive was the interest shown in the subject of lubrication and inspection. One factory representative stated that some of its dealers were giving a flat rate service and that it was practical. In the discussion following it was the consensus of opinion that the dealer should be sold the value of proper lubrication service. The next few months will see progress along this line. One big factory will shortly announce its dealer lubrication service plan, perhaps before this article appears in print.

The service association conference was started by Alexander Johnston, editor of Motor, who presented the car owner's point of view on service. The car seller's angle was given by Eugene Silver, Cole distributor, Chicago, and the maker's by B. B. Bachman, president of the S. A. E., and engineer of the Autocar Company. If the service men anticipated a technical paper they must have been disappointed, for it was not. Mr. Bachman presented some practical suggestions. Extracts from his paper are given at the conclusion of this report.

Brief Experience Accounts Given

Secretaries of the service association, dealer, gave short accounts of the formation of their organization, that which has been accomplished and their plans for the future. That the factory men were interested was evident from the discussions following. What the service association representatives accomplished was selling the factories on their value in service, hence the resolution adopted by the convention pledging support and co-operation. H. R. Cobleigh, secretary of the N. A. C. C. service committee, outlined the speaker's bureau of the service division of the chamber. Films were shown on the last day.

In summarizing the convention it may be said that the active interest and spirit of co-operation shown throughout augurs well for the progress of a standardized service and for selling the service movement by co-ordinated efforts. As previously pointed out, the dealer and trade associations should heartily endorse and support the local association and also sell the idea to the public. No doubt the dealers will do this when they clearly realize the advantages which they will derive from such co-operation. With all branches, the factory, its engineers, service men, dealer and his service men, shoulder to shoulder, the day of that "service which satisfies" is only a question of time.

Industry Now in a Third and Most Important Period

This Era Involves the Selling of the Product and Keeping It Sold. Automotive Transportation is a Necessity, and to Satisfactorily Meet Its Demands There Must Exist Efficient and Sufficient Service Facilities

Extracts of an Address Delivered by Mr. B. B. BACHMAN, Chief Engineer of the Autocar Company, at the Factory Service Managers' Convention, in Which Service is Summed Up in an Educational and Impressive Manner

IT would seem to be fundamentally sound to anticipate that a piece of mechanism as complicated as an automobile, even if placed in the hands of the most expert operator but subjected to the variables of climate and road condition to which it is generally exposed, would, even if initially perfect in design and in the selection of materials and in the manufacture and assembly of component parts, be subject to wear and depreciation which at sometime or other during the life of the device, would make attention necessary in the way of adjustment, repair or renewal of parts, which could only be properly taken care of in an adequately equipped shop, manned by a trained and intelligent organization. It would seem to be equally rational to assume that the provision of such facilities would constitute an adjunct to the business of manufacturing and selling automobiles which could not only perform its functions to the enhancement of the reputation of the product which it serves, but also accomplish this result on a profitable basis.

Why Service Facilities Are Imperative

If under the ideal conditions outlined in the foregoing we recognize the need for a service organization, it is at once manifest that a departure from this ideal state by the introduction of other complicating factors such as inexpert operation, mistakes in design, shortcomings in manufacture, both in materials and parts, to mention but a few, makes it absolutely essential that any product, to be successful in the hands of the user, must have these service facilities.

It is probably too much to expect that a vehicle as it leaves the manufacturer's hands should be perfect and that no variables of performance or construction should be present. In the event of the presence of these variables it is, of course, not to be supposed that the purchaser should be penalized by having to bear the burden of the results of these shortcomings. On the other hand, it is possible that a moderate expenditure on the part of a selling organization in the way of free service may be a legitimate form of advertising, particularly in new territories, or with unskilled operators.

It is, of course, self-evident that the

facilities mentioned cannot of themselves insure satisfactory services or insure that minimum of maintenance expense which is rapidly becoming essential. The designer cannot content himself with creating a cleancut, neat design with proper factors of safety in materials and adequate bearing surfaces and facilities for lubrication if the components are so related to each other that only with an unwarranted expenditure of labor and the use of special tools and equipment can the machine be repaired. He must recognize that there are certain things which will happen, making repair and adjustment necessary and must provide in the design that this can be done easily and economically just as he knows there are certain things which must not fail except under the most extreme circumstances.

In laying down a design for a vehicle there are a number of limiting factors which must be taken into consideration. Some of these are of a commercial nature, such as the market which is to be reached and the price level which is to be established. Some of them are of a technical nature, such as the power and performance which is to be expected and the strength and endurance which is to be built into the design. Some of them have to do with production, such as the character of the parts in relation to the equipment and plant available. Some of them have to do with operation and service, such as the number and complexity of the parts and the accessibility for repair and adjustment. * * *

Value of Unified Service Opinion

In most organizations the influence of the commercial sales and production divisions of the organization are closer to the designer than is the service end, with the result that more attention is paid to ease and economy of manufacture and to appearance than is given to the equally important matter of accessibility and simplicity in maintenance. I believe that one reason why this is so is because there has not been the unified opinion from the service department as a result of co-operative activity that there have been through the other divisions.

From the foregoing, we can say that the interest of the manufacturer in the establishment and maintenance of ade-

quate service facilities lies in three directions; first, that his product shall be placed in the hands of the prospective user with such instructions as are essential to insure its being operated in a correct manner; second, that along with the facilities for selling the product there shall be adjacent to each user an organization and equipment competent to remedy such defects in design and manufacture as may exist and for which he is responsible, and facilities for the supply of such renewal parts, and for the performance of such repair work as will be necessary due to normal depreciation from usage; third, an organization which by its competence and familiarity with the product can report the nature and scope of difficulties which develop in service, either due to defective construction or normal usage, together with criticism of the design from the viewpoint of accessibility, for the purpose of permitting intelligent and constant development and improvement of the product. * * *

What Design and Production Did for United States

The United States is the only country which, up to this time, has adopted the automobile as an everyday, all-the-year-around, continuous means of transportation. One reason for this is because we have by the character of design and our methods of production, been able to place vehicles in the hands of the public at prices that came within the reach of everyone, irrespective of social or financial conditions.

The matter of the oft-discussed topic of the saturation point of the automobile market bears no significance in my mind, except insofar as we find ourselves unable to find practical means of keeping the cost of operation down to reasonable figures. How to do this has no part as a subject in my discussion, but it is a subject with which the service man and the service organization is most intimately and vitally concerned, and the sooner the service people can get together and discuss this problem from all its manifold angles and present the subject, analyzed and in detail, to the sales, production and engineering organizations with which they are connected, the sooner will we begin to make real progress along

this line. It is probably unnecessary to point out that a great deal of progress can be made and as stated before it is absolutely essential.

The spirit of the times is for increased co-operation in the development of matters of this sort which will move forward, the individual with the industry. This co-operation does not mean the elimination of rational competition, but it does mean the elimination of unreasoning antipathy to associating and **exchanging experience on a co-operative basis with others in the same line of endeavor.**

It is not so many years ago that the automobile industry was composed of a group of units, each individual being suspicious of the methods and ideals of its competitors. Our factories were locked up, and particularly our experimental and engineering departments were kept guarded in a most jealous manner.

The contact and association between manufacturers which has been developed in the National Automobile Chamber of Commerce, growing out of the Association of Licensed Automobile Manufacturers and the interchange of ideas and the expansion in knowledge which has resulted from the growth of the Society of Automotive Engineers, successor to the old mechanical branch of the A. L. A. M., has been in harmony with the increase in co-operation in all lines of endeavor. The results have indicated how much is to be gained by this form of association and interchange of ideas.

The S. A. E. has recognized for some time that in the automotive field, as with the railroad, there would eventually be many more engineers occupied with the operation of vehicles than with their design and construction, and that to become a truly representative organization for the engineering fraternity of the automotive field it would be necessary to widen its field of operations and the scope of its progress in order to provide for this large and rapidly growing class of men.

What Associations Did for the Industry

Therefore, within the last several years there have been held in Chicago in connection with the National Automobile Show a meeting of the society devoted to the subject of service. While the attendance at these meetings has been fair it has not come up to the full possibilities. We are prepared to admit the possibility that the programs which have been selected may not have carried the fullest appeal to the service men. At the same time, it is fair to state that it has been exceedingly difficult to get competent service men into the frame of mind where they would open up and present their views. It is no unfair criticism to suggest that possibly the service men as a class have not come up very far from the status of mere repair men and have not obtained the broad view of the necessities and possibilities in their field which can be developed. As stated, this is no criticism, but merely an endeavor to point out the need for a broader viewpoint to be obtained only by mixing and thinking in broader terms.

There are two broad general fields in the automobile industry in which the

engineer has an opportunity to use his talents. These two broad general fields are subject to many subdivisions with which I will not attempt to deal. One field is the field of construction, incorporating the subdivision of research, design, development and production. The second is the field of operation, embracing the **subdivision of service and application.**

You will readily understand that the first engineering talent which came to notice in the industry was that talent which designed the vehicle. This is self-evident for the reason that no ingenuity could be exercised in constructing and servicing vehicles until the designs had been created. We can all recall the advertisements of earlier days in which the names of famous designers were placed before the public as sufficient reason for their purchasing the product which they had created.

Following this creative period, we came into the period of rapidly expanding production. With an eager public apparently able to absorb an almost unlimited output, it is only natural that the problems of service should have had relatively less attention paid to them than the problems of production. I believe that this condition has changed, and that we are entering into a **third period in which the question of properly selling the product and of keeping it sold is involved.**

Professional Jealousy Must be Eliminated

It is of fundamental importance to the growth of the industry that professional jealousy or lack of sympathy between these various divisions should be eliminated and that in their stead there should come the most complete harmony and co-operation. It is manifestly impossible for any but the most exceptional man to become expert in all of these various lines. It is equally certain that expert advice from all of these fields is necessary in order to satisfactorily develop the automotive vehicle. It is therefore essential in order that this end may be obtained that organizations should exist in which the members of the different groups can co-operate and interchange experience with their fellows in the same group and in the entire field.

To do this, as I have suggested before, requires a broader vision of the subject than is possible for the ordinary man to obtain in his own limited sphere of activities.

The value of service to the industry and the importance of the service man are such that he should not be content to drift along with the times, but should take active steps to place his part of the industry and himself on a par with all of the other divisions and individuals.

I believe that the only way this can be done is by effective co-operation. The formation of **local service organizations** is an excellent and effective way to accomplish this to a very large degree. There are, however, many phases to the business of service and each has its own problems as well as common ones. As an engineer, I naturally see the engineering side most clearly, and therefore in addition to this form of general organization, I believe

that for the service engineer, at least, he should avail himself of every opportunity for association with his fellows in the industry.

It is in this field that I believe the S. A. E. can be of assistance. The constitution of the society in citing qualifications for membership recognizes the standing of the competent engineer in the service field, as well as in the production and designing fields. For the service engineer to correctly analyze his problems, he must have, in addition to the experience gained by close association with the vehicle in operation, a broad view of the principles underlying the design and production of the vehicle. This is just as important to him as it is to the designer to have before him the necessities of operation. To get this broader viewpoint, they both need more intimate contact which the society has the means to provide if advantage is taken of these facilities.

Six Thoughts to Think About

In closing, let me emphasize the following:

1. Automobiles are a transportation necessity.
2. To fill this need satisfactorily, there must exist efficient and sufficient service facilities.
3. We do not have these facilities in the necessary quantity and quality today.
4. The business of furnishing service in this field of transportation can be made profitable if conducted properly.
5. To conduct it properly and thereby profitably, there is much to learn and many problems to solve.
6. In learning the requirements and solving these problems, co-operative endeavor in helping the weak to become strong will help the strong to become stronger.

Electric Garages Increase Service Facilities

In anticipation of a great increase in the use of electric trucks in New York during the next two years, garage managers are making substantial enlargements in their service facilities and at least one stable, recognizing that Dobbin's days are numbered, is being converted to a garage.

The stable of Wendall and Evans Co., at 160 W. 10th St., has room for two hundred horses. The stalls are now being removed, new floors laid, and when the alteration is completed there will be facilities for garaging 175 electric vehicles. The Wendall and Evans garage will handle electrics exclusively.

The Commercial Truck Co., of Philadelphia, has leased the big building at 524 W. 19th St., and when alterations are completed, will operate a service station and garage with accommodations for 150 trucks. The Walker Vehicle Co., of Chicago, has outgrown its present quarters in Long Island City, and has just given contracts for the erection of a new building at 13th St. and Ely Ave., L. I. City. The garage will occupy a plot 100 by 100 ft., will be three stories in height, and, with 30,000 sq. ft. of floor space, will be able to care for 350 trucks.

NEW COMMERCIAL CARS



Highway Special Now Ready for the Market

THE Highway Special, a new product of the United Motors Products Co., Grand Rapids, Mich., announced late in the summer, is now being placed in the hands of distributors throughout the country.

The new truck is rated from 500 to 2000 lb. and the low price of \$895 for the chassis, includes electric lighting and starting equipment and pneumatic cord tires.

The chassis has been worked out in accordance with the most advanced truck practice and is the result of the United organization's 12 years' experience in

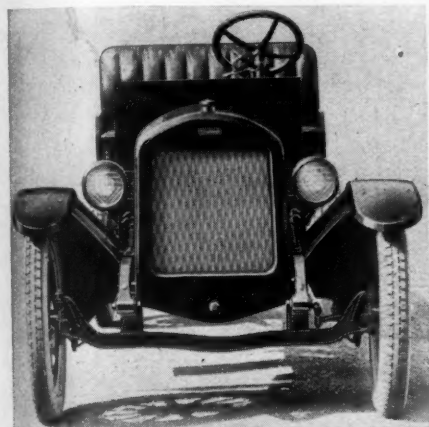
The engine is a special Herschell-Spillman, having a bore of $3\frac{1}{2}$ in. and a stroke of 5 in. and the electric equipment is of the latest type Bosch system.

The cooling system includes a baked enamel, heavy pressed steel shell radiator with removable core and tanks. Special

attention has been given in mounting to prevent vibration and road shocks on the core. A Zenith improved jet type carburetor is used with gravity feed from a 15 gal. tank located under the seat.

Clutch and transmission is of Fuller make and is mounted in unit with the power plant. The gear-set, which is selective, provides 3 speeds forward. The clutch is of the dry-plate, multiple disk type.

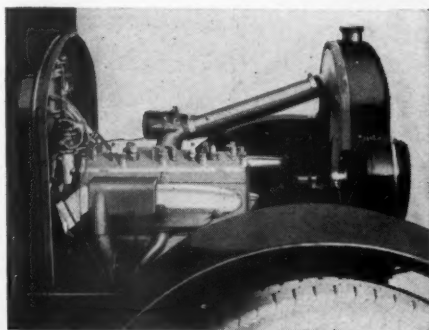
The rear axle is a Columbia spiral bevel type with one-piece pressed steel housing, 5.8 to 1 ratio. Drive is taken by Single Spicer propeller shaft of $2\frac{1}{2}$ -in. diam. tub-



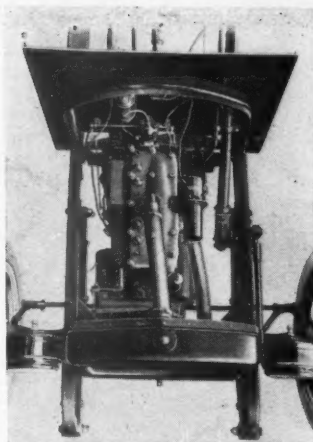
The Radiator Core is so Mounted as to be Easily Removed from the Shell for Repairs

building heavy-duty trucks. The feature which the company is stressing is the fact that every unit is a high grade truck part and that the Highway Special does not follow pleasure car design in any particular.

It is adapted to high-class delivery service when equipped with the panel body, which is of exceptionally pleasing lines and attractive finish and is also supplied from the factory with canopy stake and express bodies, which have been standardized for this job.



Showing the Engine Mounting. The Locations of the Units Make for Accessibility



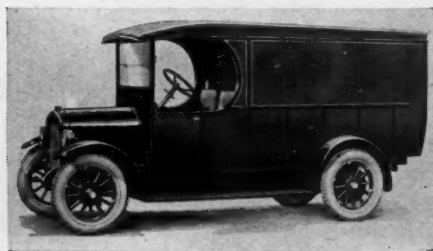
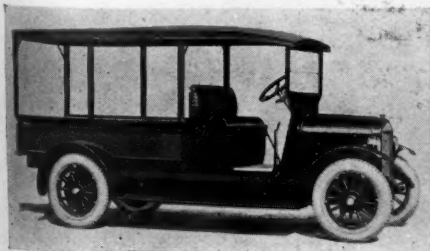
The Engine is Assembled and Mounted to Make for Ready Access to All Units



All Controls Are Conveniently Placed and Present a Neat Appearance at the Dash

ing with two universals. Both brakes operate on drums on rear wheels with $16\frac{3}{8}$ -in. drum.

The frame is of pressed-steel construction, $4\frac{3}{8}$ in. deep with $3\frac{1}{2}$ -in. flanges at center. The distance from back of driver's seat to end of frame is 92 in., with 128-in. wheelbase.

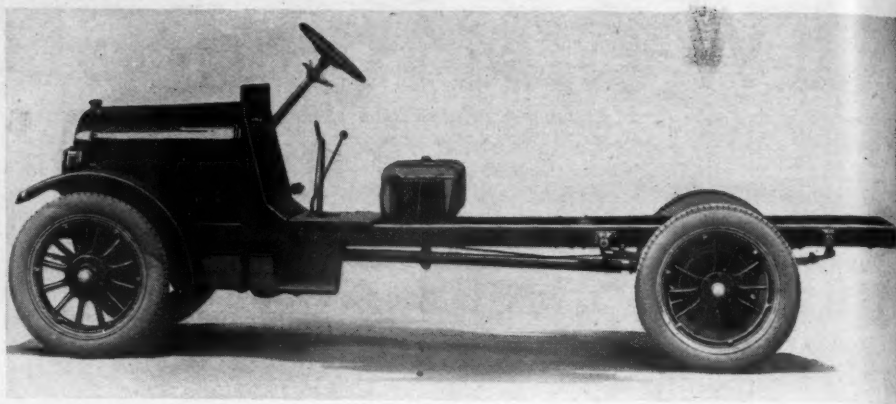


Left: Canopy Top Express Body. Center: Versatile Stake Body With Comfortable Cab. Right: Attractive Panel Delivery Body

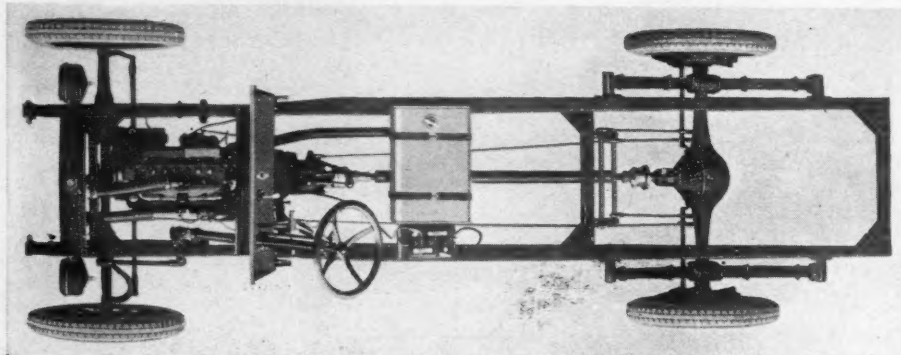
Steering is provided by a late type Lavine through worm and nut, with accessible adjustments for all wear.

Springs are of the semi-elliptic type, chrome-vanadium steel; front eight plates $2\frac{1}{4}$ in. wide by $36\frac{1}{4}$ in. long, rear ten plates $2\frac{1}{4}$ in. wide by $46\frac{3}{4}$ in. long. The wheels are wood artillery type with Firestone rims and $32 \times 4\frac{1}{2}$ in. tires. Standard equipment includes complete set of tools, hand tire pump, jack and electric horn. Standard colors are black running gear with United green wheels.

The company is prepared to furnish all types of bodies and special attention has been given to high-class body equipment for the highest class delivery service.



Above: Left Side View of the New Highway Special Chassis, Recently Announced by the United Motors Products Co., Grand Rapids, Mich.



Left: The Construction of the Chassis is Modern in Every Respect, Making for Rigidity and Even Balance Throughout Its Entire Length

Standard Places a Specially Built Bus-Job on the Market

A NEW bus modern in body furnishings and appointments, making for maximum passenger comfort, was recently announced by the Standard Motor Truck Co., Detroit, Mich. The chassis, which is known as the model AK, provides for all the requirements set forth by modern passenger transportation service. The kick-up over the rear axle, for example, allows for a low seated body facilitating rapid and easy passenger movement in and out of the bus. And, four-speed transmission permits easy negotiation through thickly congested traffic. The units employed are all of standard make, specially designed for bus service, well balanced and assembled.

The engine is a Continental, model L-4. It is of the 4-cylinder, L head, removable head type, suspended from three points. Its S. A. E. rating is 32.4 hp., with an actual brake hp. of 39 at 1000 r.p.m. and 48 hp. at 1400 r.p.m. Lubrication is by full pressure feed. Speed is controlled by a Simplex governor driven from the engine. The flywheel housing also accommodates a Bosch starter, which operates with Bendix shaft through teeth in the flywheel. Ignition is by Eisemann magnet, model G-4, 2nd edition. Fuel is transmitted from a 35-gal. tank located under the driver's seat by a vacuum to a Stromberg $1\frac{1}{4}$ in. carburetor. The cooling system consists of a Long vertical tube type radiator with cast tanks and a cen-

trifugal water pump of special design. Its capacity is 30 qts.

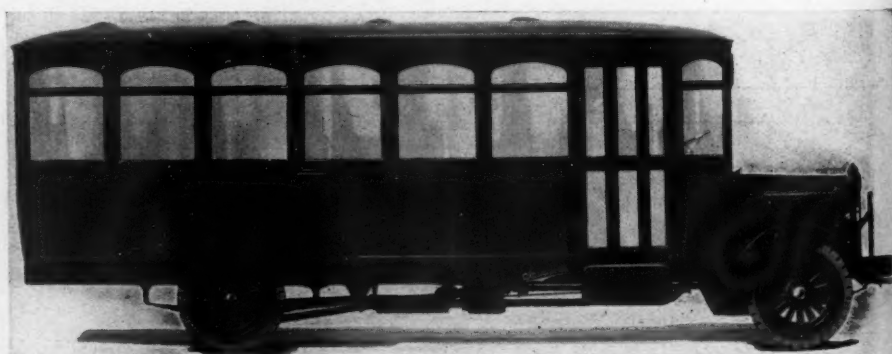
From the engine the power is carried through a Brown-Lipe model 50 clutch in unit with the engine, to a Brown-Lipe model 50 gearset, mounted amidships and supported in the chassis at three points on two cross members. It provides four speeds forward and one reverse. The gear ratios are as follows: First, 4.84 to 1; second, 2.84 to 1; third, 1.76 to 1; fourth, 1 to 1; and reverse, 5.81 to 1.

The propeller shaft assembly consists of a two-piece tubular shaft equipped with Spicer universal joints. The working parts of the joints are completely enclosed in dirt-proof steel shells, which also retain the lubricant. Final drive is through a Timken special bus type, worm drive, full-

floating rear axle. The wheel track is 72 in., spring centers, 35 in., and road clearance, $6\frac{1}{2}$ in. Final gear reduction is 8.5 to 1. Service and emergency brakes are provided for in the rear wheels. They are internal expanding and of Duplex make. The front axle is also of Timken make, designed especially for bus service.

Drive thrust from the rear axle is taken by the chassis through radius rods of heavy construction. Torque reaction is taken by rear springs which cushion shock loads due to sudden starting and braking.

The frame is supported by four semi-elliptic springs. It is of 7 in. pressed steel, $\frac{1}{4}$ in. thick with $2\frac{1}{2}$ in. flange. A kick-up of frame is provided over the rear axle. Sewell cushion wheels, semi-pneumatic tire equipped, are used.



Model AK, the New Special Standard Passenger Bus

Steering is through a Gemmer, model R, worm and wheel type steering gear, located on the left side. Spark and throttle levers are provided just under the 20 in. hand wheel. The wheelbase is 190 in.

The body, which has a length overall of 24 ft. 6 in., width of 7 ft. 2 in., and height of 6 ft. 5 in., weighs approximately 2800 lb.

The entrance door, which is at the right side, is of the folding type with step. The rear door is of the emergency type. The entrance door is fitted with full length glass panels, permitting the operator a

clear view of the step. Ample space is provided at the front end, allowing free movement in and out of the bus, which is especially necessary, as the operator collects the fares at this point. A light is provided directly over the fare box and the entrance. Both are operated with the door switch. Each side of the body is provided with seven windows, sash glazed with two lights of glass. The lower one is designed to drop into a pocket. The roof is of the arch type.

Twenty stationary cross seats, a full

width rear seat and one single row low back seat near the front door, makes up the seating arrangement. Seat cushions and backs are of rattan.

The lighting equipment consists of six 21 cp., 12 v. lamps with limousine fixtures, equally spaced on each side of the center line of the body with switch and fuse located near the operator. A Farraday buzzer system is used for signaling. Heating is from the exhaust. Two ventilators are provided in the center of the roof.

Fitz-Er Offers Three Bus Models

INTER-CITY motor bus transportation is developing in leaps and bounds. Interurban electric railways in all parts of the country are recognizing this new trend in inter-city passenger transportation, and many of them are supplementing their equipment with motor bus lines. It goes without saying that there is a big future ahead for the distributor or dealer who establishes himself as the logical source of supply in his territory for high-grade motor buses.

The Fitz John-Erwin Mfg. Co., Muskegon, Mich., appreciating this situation has accomplished much along the lines of

The model F-75 is 13 ft. long, 72 in. wide, 66 in. high, and provides seating accommodations for 16 passengers.

Sill and post construction is of selected seasoned oak and ash. All the panels, which are of 20-gage patent leveled auto body sheets, are securely fastened to the side posts. A full length running board, covered with linoleum and aluminum edged, is provided on the right side. Thumb screw attachment makes the section at the rear wheel easily detachable.

Four doors open on the right side and one at the left for the use of the driver. Heavy duty hinges and substantial door

sedan type of window lifts. The windshield is of the full ventilating type, operating on double action hinges. The roof is of the arch type. The top slats are tongued and grooved and are covered with 12 oz. black oiled duck. The roof is securely reinforced by hardwood bows.

In the interior the ceiling is finished off in paneled beaver board painted dark stippled gray. The window posts and rear are lined with leather. All the interior wood is in trim finished walnut.

The heating system consists of 1½ in. heat pipes running entirely around the body. It is operated by a butterfly valve from the driver's seat. Push buttons are located in the center of the back of each seat.

Joints and mouldings before being applied are given a heavy coat of marine glue to insure water tightness and preserve the paint. Exterior painting is at the option of the purchaser.

Universal Offers Mechanical Dumps

The Universal Hoist & Body Co., Paris St., Everett, Mass., successors to Lally Commercial Body Co., is offering a line of hoists and dumps known as the Metropolitan.

The body is constructed of best grade steel designed and reinforced to withstand severe usage. The tailgate is of a type that swings from the top, which can be released either before or after the body has been elevated. In view of the height to which the body can be elevated and the construction of the 18-gage, reinforced steel, telescope chute, which is suspended beneath the body, coal or other material can be chuted at right angles over side

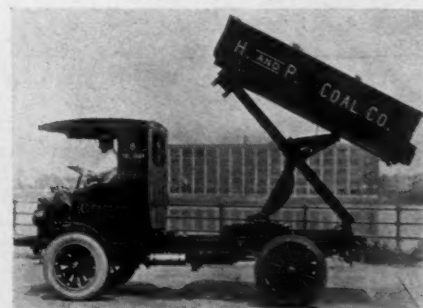
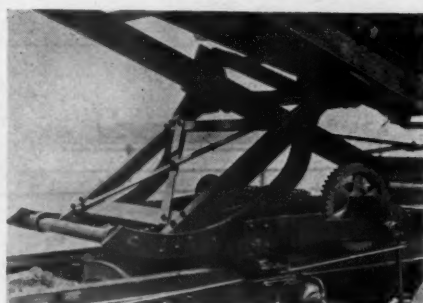


New Fitz-Er Limousine Type Bus Body, One of the Three Recently Introduced Standardized Jobs

standardizing bus body equipment in its three model line, designed expressly for Reo speed wagon chassis. These bodies, designed by veteran craftsmen in coach and Pullman car building, are described as being of sturdy construction, fine workmanship and finish, and an embodiment of all the latest features which comprise modern motor bus designing. Quality in material was another of the prime considerations in the designing of these bodies. It was decided that high-grade equipment created greater patronage and that in the long run it would be far more economical than original cheapness.

The accompanying illustration and following specifications review are of the Fitz-Er limousine type bus body, model F-75. If details on the other two models, the model F-60 and model B-51 Pay-As-You-Enter type bus bodies are desired, they can be had by writing to the Fitz John-Erwin Mfg. Co.

locks with nickel plated drop handles are used on all doors. Four full cross seats allow maximum comfort and ample leg room. Foot rests are provided. The upholstery includes genuine black leather and comfortable cushion springs, designed deep. The 3/16 in. plate glass windows lower into the doors by means of regular



Close-up and Complete Views of the New Universal Mechanical Dump

walks, fences and even around corners. Standard units range in capacity from 1 to 5 tons, and special units from 6 to 10 tons. All are power-operated except the 1 to 1½ ton model which is hand operated. The brunt of the load is borne by anti-friction steel rolls and the specially formed steel hoisting arms in turn bear on the rolls. The steel arms also offer a direct shove at the center of the load. Heat-treated link steel chains draw the arms over the steel rolls. Overwinding is pre-

vented by an automatic stop, which is claimed to make the mechanism fool-proof.

The hoist can be stopped at any elevation, position maintained at any desired length of time, and full or part load returned to the lowered position without operator leaving the seat. The height from the ground to scuttle door is 80 to 84 in. when elevated, and the distance between the bottom of the body and chassis frame is 14 in. Weight of hoist and body on two-ton units is 2200 lb.

Southern Concern Brings Out New Dumping Trailer for Fordson

THE Virginia Truck Body Co., 19 S. Linden St., Richmond, Va., recently made a worthy contribution to the trade in placing on the market a dumping trailer for use in connection with a Fordson tractor. This product is essentially an assembled proposition containing only units of reputable and well known manufacturers. The disposition of the various units is such that the resulting equality in load distribution affords maximum traction to the tractor and long life to the trailer.



Complete View of the Virginia Dump Body Hooked Up to a Fordson.
Note the Goose-Neck Connection

The manufacturer, of this regular government 2-wheel trailer, in describing its product also points out that the price is in good proportion to the cost of the tractor, the list price of the trailer complete with body, hoist and goose-neck hitch being \$700.

The body is constructed of 10-gage steel heavily reinforced, hot riveted throughout. Outside measurements, 96 in. long, 54 in. wide, and 18 in. deep. Capacity 2 cu. yd., water level. It is equipped with a manual and double acting tail-gate, which permits the loading of lumber and other length material as well as dumping material. When the tail-gate is down it adds 18 in. additional length to the body. The top of the sides are flared outward to give additional strength. The corners are square which adapts the trailer to the hauling of bricks, etc.

The gears of the hoist, which will handle any load with ease, are cut from solid metal. The pinion and shaft are machined from a single steel forging. All bearings are provided with recesses which are packed with grease at the time the hoist is assembled. A ratchet is provided which holds the load in any position, and a brake enables the body to be lowered quickly and under control.

One of the features of construction is the goose-neck hitch which allows the tractor wheels to cut under. This construction permits the job to turn a complete circle in almost any road without backing. The hitch includes all items necessary for attaching to the tractor.

The trailer is equipped with an adjustable screw stand for stabilizing in a horizontal position when not in use. By use of this stabilizer, the height of the front of the tractor can be regulated when not attached to the tractor. This is said to make coupling to the trailer easy, and can be accomplished by one man without lifting. Four anchor blocks on chains attached to the frame for blocking the wheels, are also provided.

Additional specifications are given below:

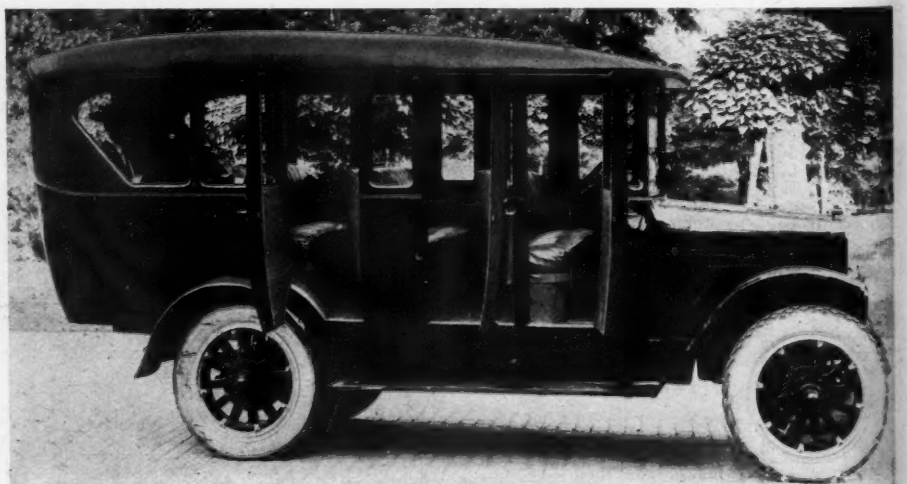
Wheels: Built double disk steel. Bearings: Timken roller. Axle: Chrome vanadium steel, 2¼ in. x 1¾ in. Frame: Heavy channel iron, 5 in. x 1¾ in. Springs: Semi-elliptic, 60 in. x 3 in. braced bushed, 10 leaf, underslung. Capacity: 5,000 lb. Weight: 3500 lb. Tires: 36 x 6 solids. Color: Lead priming.

The New International Speed Sedan

In the transportation of passengers to clubs, hotels and summer resorts a very high grade of vehicle is essential. The ordinary bus designed particularly for capacity in this case doesn't fill the bill. Something which in its appointments and comforts provided approaches the ordinary private-owned quality car is demanded. For the purpose, therefore, the International Harvester Co. has recently introduced a veritable deluxe bus, the International Model S Speed Sedan, as it is called.

The top of this new speed sedan is of standard car construction. The interior of both top and body are attractively finished. The seats are wide and deep-cushioned. Fourteen to fifteen passengers may be comfortably seated in the cross seats from which they can obtain unobstructed view. Entrance is obtained through three good-sized side doors, while passage at end of the third seat gives easy access to the rear without disturbing other passengers.

This job is claimed to combine the sturdiness and endurance of the heavy-duty bus with the flexibility and speed of the touring car. With the Model S Chassis speeds of 25 to 30 m.p.h. can be attained. The length of chassis over all is 181½ in. Heavy pneumatic truck cord tires are a part of the regular equipment.



The New International Speed Sedan of Recent Announcement

Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE											BRAKE LINING							FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Acason R-1	4	1 1/4	1										11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason RB-1 1/2	4	1 1/4	1										11 1/2	3	1/4	2	11 1/2	3	1/4	2	112	34
Acason H-2 1/2	4	1 1/4	1 1/4										13 1/2	3 1/2	3/4	2	13 1/2	3 1/2	3/4	2	130	35
Acason L-3 1/2	4	1 1/4	1 1/4										16	3 3/4	3/4	2	16	3 3/4	3/4	2	163 1/2	35
Acason M-5	4	1 1/4	1 1/2										18	4 1/4	3/4	2	18	4 1/4	3/4	2	167 1/2	35
Ace, Series A-1 1/2	4	1 1/4	1 1/2	1 1/4	H	10 3/4	2 1/4	6 1/2	2	37 1/2	1	F	12	3	1/4	2	12	3	1/4	2	122 1/2	32
Ace, Series A-2 1/2	4	1 1/4	1 1/2	1 1/4	H	10 3/4	2 1/4	5 1/2	1 1/4	33	1 1/4	F	13	2 1/2	1/4	4	13	2 1/2	1/4	4	144 1/2	32
Aome 20-1	4	1 1/4	1	1	H	11	2	11	2	38 1/2	1 1/4	F	12	3	1/4	4	12	3	1/4	4	110 3/4	34
Aome 30-1 1/2	4	1 1/4	1	1	V	11	2	11	2	38 1/2	1 1/4	V	12	3	1/4	4	12	3	1/4	4	110 3/4	34
Aome 40-2	4	1 1/4	1	1	V	8	1 1/4	11 1/2	1 1/4	40	1 1/4	V	12	3	1/4	4	12	3	1/4	4	123 3/4	34
Aome 60-3	4	1 1/4	1 1/4	1 1/4	V	11 1/2	1 1/4	11	1 1/4	39 1/2	1 1/2	F	13	3 1/2	3/4	4	13	3 1/2	3/4	4	132 3/4	34
Aome 60L-3	4	1 1/4	1 1/4	1 1/4	V	11 1/2	1 1/4	11 1/2	1 1/4	41 1/4	1 1/2	F	13	3 1/2	3/4	4	13	3 1/2	3/4	4	140 3/4	34
Aome 90-4 1/2	4	1 1/4	1 1/4	1 1/4	V	10	1 1/4	13	1 1/4	41 1/4	1 1/2	F	15 1/2	4	3/4	4	15 1/2	4	3/4	4	150 3/4	36
Aome 125-6 1/2	4	1 1/4	1 1/4	1 1/4	V	11	2	14	2	40	2	F	18	4	3/4	4	18	4	3/4	4	159 3/4	37
American 25-2 1/2	4	1 1/4	1 1/4	1 1/4	V	19	1 3/4	17	1 3/4	38	2	F	19	2 1/2	3/4	4	19	2 1/2	3/4	4	142	33
American 40-4	4	1 1/4	1 1/4	1 1/4	V	19	1 3/4	9 1/2	1 3/4	38	2	F	57	2 1/2	3/4	4	41 1/2	2 1/2	3/4	4	142	37
American 50-5	4	1 1/4	1 1/4	1 1/4	V	19	1 3/4	9 1/2	1 3/4	38	2	F									158	37
Apex C-1	3	1	1	1	V	7 1/4	2	12	2	36 1/2	1 1/4		42	2		2	41 1/2	2		2	102	35 1/2
Apex D-1 1/2	3	1	1	1	V	7 1/4	2	12	2	36 1/2	1 1/4		42	2		2	41 1/2	2		2	102	35 1/2
Apex E-2 1/2	4	1 1/4	1	1 1/4	V	7 1/4	2 1/4	8	2	32	1		54	2 1/4		2	53 1/2	2		2	128	31 1/2
Apex G	4	1 1/4	1	1	V	12	2 1/4	15 3/4	2	34 1/2	1 1/4		24	2		2	41 1/2	2		2	102	35 1/2
Armleder 21-1 1/2	4	1 1/4	1	1	V	12	2 1/4	16 1/2	1 1/4	31 1/2	2	F	11 1/2	3	3/4		11 1/2	3	3/4		Opt	32
Armleder 40B-1 1/2	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	33 1/2	2 1/4	F	13 1/2	3 1/2	3/4	4	11 1/2	3 1/2	3/4	4	Opt	32
Armleder 40C-1 1/2	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	33 1/2	2 1/4	F	13 1/2	3 1/2	3/4	4	11 1/2	3 1/2	3/4	4	Opt	32
Armleder KWB-3 1/2	4	1 1/4	1 1/4	1 1/4	V	12	2	16 1/2	1 1/4	35 1/2	2 1/4	F	42	3	3	1	16	3	3	8	Opt	36
Armleder KWC-3 1/2	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	16 1/2	1 1/4	35 1/2	2 1/4	F	42	3	3	1	16	3	3	8	Opt	36
Armleder HWB-2 1/2	4	1 1/4	1 1/4	1 1/4	V	9 1/2	2	11 1/2	1 1/4	33 1/2	2	F	13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	Opt	32
Armleder HWC-2 1/2	4	1 1/4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	33 1/2	2	F	13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	Opt	32
Atco B-1 1/2	4	1 1/4	1	1	V	11	2	11	1 1/4	31 1/2	2 1/4	F	25 1/2	3	3/4	4	18	2 1/2	3/4	4	109 3/4	32
Atco B1-1 1/2	4	1 1/4	1	1	V	11	2	11	1 1/4	31 1/2	2 1/4	F	25 1/2	3	3/4	4	18	2 1/2	3/4	4	109 3/4	32
Atco A-2 1/2	4	1 1/4	1	1 1/4	V	12	2	11 1/2	1 1/4	33 1/2	1 1/2	F	46	2	4	2	46	2	4	2	109 3/4	32
Atlas 22-1	4	1 1/4	1	1 1/4	V	10	1 1/4	11	1 1/4	33 1/2	1 1/2	F	25 1/2	3	3/4	4	18	2 1/2	3/4	4	124 1/2	33
Atterbury 20R-1 1/2	4	1 1/4	1	1	V	8	1 1/4	14	1 1/4	38 1/2	1 1/4	F	40	2	4	2	22 1/2	3	3/4	4	84 3/4	33 1/2
Atterbury 22C-2 1/2	4	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/4	16	1 1/4	38 1/2	1 1/4	F	11 1/2	3 1/2	3/4	4	11 1/2	3 1/2	3/4	4	122 1/2	34
Atterbury 22D-3 1/2	4	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/4	16	1 1/4	40 1/2	1 1/2	F	13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	129 1/2	34
Atterbury 8E-5	4	1 1/4	1 1/4	1 1/4	V	14	2	20 1/2	2	40	2	F	15 1/2	3 1/2	3/4	4	15 1/2	3 1/2	3/4	4	142 1/2	37 1/2
Autocar XXI-F-2	3	1	1	1	V	3-4	1 1/4	5	1 1/4	49 1/2	2		17 1/2	4	4	4	17 1/2	4	4	4	157 1/2	37 1/2
Autocar XXI-G-2	4	1 1/4	1	1	V	3-4	1 1/4	5	1 1/4	49 1/2	2		16 1/2	4	4	4	13 1/2	2 1/2	3/4	4	91	34
Autocar XXVI-Y4	4	1 1/4	1	1	V	3	1 1/4	3 1/2	1 1/4	49 1/2	2	F	25 1/2	3 1/2	3/4	4	25 1/2	3 1/2	3/4	4	114	34
Autocar XXVI-B4	4	1 1/4	1	1	V	3	1 1/4	3 1/2	1 1/4	49 1/2	2	F	25 1/2	3 1/2	3/4	4	25 1/2	3 1/2	3/4	4	140	34
Autocar XXVII-H4	3	1	1	1	V	3	1 1/4	3 1/2	1 1/4	47 1/2	2	F	25 1/2	3 1/2	3/4	4	25 1/2	3 1/2	3/4	4	176	34
Autocar XXVII-K4	3	1	1	1	V	3	1 1/4	3 1/2	1 1/4	47 1/2	2	F	22 1/2	3 1/2	3/4	4	22 1/2	3 1/2	3/4	4	131 1/2	34
Available H-1 1/2	4	1 1/4	1 1/4	1 1/4	V	11	1 1/4	14	1 1/4	40	2		48	3 1/2	3/4	4	36	3 1/2	3/4	4	155 1/2	34
Available H-2 1/2	3	1	1	1	V	11	1 1/4	14	1 1/4	40	2		13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	120	32
Available H3	3	1	1	1	V	11	1 1/4	14	1 1/4	42	2		18 1/2	3 1/2	3/4	4	16	3 1/2	3/4	4	144	32
Available H5	4	1 1/4	1 1/4	1 1/4	V	12	2	16	2	40	2		48	3 1/2	3/4	4	36	3 1/2	3/4	4	168	36
Available H2	4	1 1/4	1 1/4	1 1/4	V	12	1 1/4	14	1 1/4	40	2	F	18	4	4	2	18	4	4	4	168	38
Available H2 1/2	4	1 1/4	1 1/4	1 1/4	V	12	1 1/4	14	1 1/4	40	2	F	13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	120	32
Available H3 1/2	4	1 1/4	1 1/4	1 1/4	V	12	1 1/4	14	1 1/4	42	2	F	13 1/2	3 1/2	3/4	4	13 1/2	3 1/2	3/4	4	144	32
Available H5	4	1 1/4	1 1/4	1 1/4	V	12	2	16	2	40	2	F	18	4	4	4	16	4	4	4	168	36
Avery 1	4	1 1/4	1	1	V	10	2	6 1/2	2	31 3/4	1 1/2	F	19 1/2	3 1/2	3/4	4	18 1/2	3 1/2	3/4	4	168	38
Bell M-1	4	1 1/4	1	1	V	10	2	10	1 1/2	32	2	F	36	2 1/2	3/4	4	42	2	3/4	4	85	34
Bell E-1 1/2	4	1 1/4	1	1	V	10	2	10	1 1/2	32	2	F	36	2 1/2	3/4	4	42	2	3/4	4	110	34
Bell O-2 1/2	4	1 1/4	1	1	V	10	2	10	1 1/2	32	2	F	36	2 1/2	3/4	4	42	2	3/4	4	114	34
Bessemer G-1	3	1	1	1	V	11 1/2	2	10	2 1/4	42	2	F	46	2 1/2	3/4	4	44	2 1/2	3/4	4	98 1/2	34
Bessemer H-2 1 1/2	3	1	1	1	V	11 1/2	2	10	2 1/4	43	2	V	16 3/4	2	2 1/4	8	16 3/4	2	2 1/4	8	116	34
Bessemer J2-2 1/2	3	1	1 1/4	1 1/4	V	12	1 1/4	5	1 1/4	36 1/2	1 1/4	F	55 1/2	3								

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME					
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service			Emergency			Length	Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All	
Clydesdale 18-1 1/4	3	3	1 1/4	1 1/4	V	15	2	12	2	41	3 3/4	V	11 1/4	2 1/2	1 1/4	4	11 1/4	2 1/2	1 1/4	4	95	34	
Clydesdale 10-1 1/4	3	3	1 1/4	1 1/4	V	9	2	9	2	41	3 3/4	V	11 1/4	2 1/2	1 1/4	4	11 1/4	2 1/2	1 1/4	4	109	34	
Clydesdale 10A-1 1/4-1 1/4	3	3	1 1/4	1 1/4	V	9	2	9	2	41	3 3/4	V	11 1/4	2 1/2	1 1/4	4	11 1/4	2 1/2	1 1/4	4	109	34	
Collier 18-1	3	3	1 1/4	1 1/4	V	9 3/4	2 1/2	10 1/4	1 1/4	40	1	F	24	3 1/2	1 1/4	4	24	3 1/2	1 1/4	4	106	36 1/2	
Collier 19-1 1/2	3	3	1 1/4	1 1/4	V	9 3/4	2 1/2	10 1/4	1 1/4	40	1	F	24	3 1/2	1 1/4	4	24	3 1/2	1 1/4	4	120	32	
Collier 21-2	3	3	1 1/4	1 1/4	V	6	1 1/2	10 1/4	1 1/4	40	1	F	27 1/2	3 1/2	1 1/4	4	27 1/2	3 1/2	1 1/4	4	144	32	
Collier 22-2 1/2	3	3	1 1/4	1 1/4	V	6	1 1/2	10 1/4	1 1/4	40	1	F	27 1/2	3 1/2	1 1/4	4	27 1/2	3 1/2	1 1/4	4	144	32	
Commerce 9-1500	3	3	1 1/4	1 1/4	V	10	2	10	2	44	3 3/4	V	50	2	2	2	48 1/2	2	2	2	92 1/2	34	
Commerce T-1500	3	3	1 1/4	1 1/4	V	10	2	10	2	44	3 3/4	V	50	2	2	2	48 1/2	2	2	2	92 1/2	34	
Commerce 12-3000	3	3	1 1/4	1 1/4	V	10	2	10	2	44	3 3/4	V	45	2 1/2	2	2	43	2 1/2	2	2	99 1/2	34	
Commerce 16-4000	3	3	1 1/4	1 1/4	V	10	2	10	2	44	3 3/4	V	50 1/2	2 1/2	2	2	48	2 1/2	2	2	108 1/2	34	
Commerce 25B-5000	4	4	1 1/4	1 1/4	V	9 1/2	1 1/2	15 1/2	1 1/2	42	1 1/2	V	13	3 1/2	1 1/4	4	13	3 1/2	1 1/4	4	132	34	
Concord A-2	4	4	1 1/4	1 1/4	H	11	2 3/8	9 1/2	1 1/2	34	2	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	108 1/4	32 1/4	
Concord AX-2	4	4	1 1/4	1 1/4	H	11	2 3/8	9 1/2	1 1/2	34	2	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	122 1/4	32 1/4	
Concord B-3	4	4	1 1/4	1 1/4	H	11	2 3/8	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1 1/4	4	13 1/2	3 1/2	1 1/4	4	122 1/2	32 1/2	
Concord BX-3	4	4	1 1/4	1 1/4	H	11	2 3/8	9 1/2	1 1/2	34	2	F	13 1/2	3 1/2	1 1/4	4	13 1/2	3 1/2	1 1/4	4	155 1/2	32 1/2	
Corbitt E-1	3	3	1 1/4	1 1/4	V	8	2	14	2	38	1 1/2	V	19	2	2	2	19	2	2	2	105	34	
Corbitt D-1 1/2	3	3	1 1/4	1 1/4	V	8	2	14	2	38	1 1/2	V	45 1/4	2	2	2	1	45 1/4	2	2	2	120	34
Corbitt C-2	3	3	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/2	2	2	51 1/2	2 1/2	2	2	138	35	
Corbitt B-2 1/2	3	3	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	36	1 1/4	F	51 1/2	2 1/2	2	2	51 1/2	2 1/2	2	2	138	35	
Corbitt AA-5	3	3	1 1/4	1 1/4	V	13	1 1/4	8	1 1/4	36	2	V	69 1/4	3	1	1	69 1/4	3	1	1	160	38	
Corbitt A-3 1/2	3	3	1 1/4	1 1/4	V	13	2	14	2	36	1 1/4	V	64	2 1/2	2	2	64	2 1/2	2	2	160	35	
Cyclone A-3000	3	3	1 1/4	1 1/4	V	16	2	16	2	32 1/2	1 1/4	F	21 1/4	2 1/2	2	2	19 1/4	2 1/2	2	2	113	34	
Dart S-1 1/2	3	3	1 1/4	1 1/4	H	11	2	8	1 1/4	36	1	F	19	1 1/4	4	4	19	1 1/4	4	4	112	34	
Dart M-2 1/2	4	4	1 1/4	1 1/4	H	11	2	13	1 1/4	35	2	F	10	2 1/2	2	2	19	3 1/2	2	2	124	34	
Dart W-3 1/2	4	4	1 1/4	1 1/4	H	11	2	12	1 1/2	36	2	F	28	2 1/2	2	2	28	2 1/2	2	2	144	38	
Day-Elder AS-1	3	3	1 1/4	1 1/4	V	9	2	9 1/2	2	40	5/8	V	19	2	2	2	19	2	2	2	108	35	
Day-Elder B-1 1/2	3	3	1 1/4	1 1/4	V	9	2	9 1/2	2	40	5/8	V	19	2	2	2	19	2	2	2	120	35	
Day-Elder D-2	3	3	1 1/4	1 1/4	V	4	4	9	1 1/2	35	2	V	45	2	2	2	45	2	2	2	125	35	
Day-Elder C-2 1/2	3	3	1 1/4	1 1/4	V	10 1/2	2	12	1 1/2	36 3/4	2	V	52	2 1/2	2	2	52	2 1/2	2	2	123	35	
Day-Elder F-3 1/2	3	3	1 1/4	1 1/4	V	6 3/4	1 1/4	12	1 1/2	35 1/2	1 1/2	F	56 1/2	2 1/2	2	2	56 1/2	2 1/2	2	2	148	35	
Day-Elder E-5	4	4	1 1/4	1 1/4	V	12 3/4	2	10	1 1/2	38 1/2	1 1/2	F	69	3	3	3	69	3	3	3	155	37	
Dearborn BW-2	3	3	1 1/4	1 1/4	V	8 3/4	2	6	1 1/2	37	1	F	18	2 1/2	2	2	18	1 1/2	2	2	130	32	
Dearborn F-1 1/2	3	3	1 1/4	1 1/4	V	12	2	8	1 1/4	37	1	F	16 1/2	2 1/2	2	2	16 1/2	2 1/2	2	2	96 1/2	32	
Dearborn C-1	3	3	1 1/4	1 1/4	V	10	2	8	1 1/4	40 3/4	1 1/4	F	38	2	2	2	38	2	2	2	107	32	
Defiance B-1 1/2	3	3	1 1/4	1 1/4	V	10	2	8	1 1/4	40 3/4	1 1/4	F	45	2 1/2	2	2	45	2 1/2	2	2	116	34	
Defiance C-2	3	3	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	54 1/4	2 1/2	2	2	52 1/2	2 1/2	2	2	116	34	
Defiance D	3	3	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	45	2 1/2	2	2	45	2 1/2	2	2	120	34	
Defiance E	3	3	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	54 1/4	2 1/2	2	2	52 1/2	2 1/2	2	2	120	34	
Defiance EL	3	3	1 1/4	1 1/4	V	10	2	8 1/2	1 1/4	40 3/4	1 1/4	F	54 1/4	2 1/2	2	2	52 1/2	2 1/2	2	2	140	34	
Denby 31-1 1/4	3	3	1 1/4	1 1/4	V	6	2 3/8	19	2	38 1/2	1 1/4	F	49	2 1/2	2	2	47 1/2	2 1/2	2	2	97 1/2	34	
Denby 33-2	3	3	1 1/4	1 1/4	V	9	2	12	2	41	1 1/4	F	8 1/2	2 1/2	2	2	46 1/2	2 1/2	2	2	120	33 1/4	
Denby 35-2 1/2	3	3	1 1/4	1 1/4	V	8	2	14 1/4	1 1/4	34 1/4	1 1/4	F	8 1/2	2 1/2	2	2	51	3	2	2	143 1/4	33 1/4	
Denby 27-4	3	3	1 1/4	1 1/4	V	13	1 1/4	16 1/4	1 1/4	38 1/4	1 1/4	F	8 1/2	2 1/2	2	2	58	2 1/2	2	2	140	34	
Denby 210-5	3	3	1 1/4	1 1/4	V	13	1 1/4	16 1/4	1 1/4	38 1/4	1 1/4	F	8 1/2	2 1/2	2	2	58	2 1/2	2	2	140	34	
Dependable Dispatch A-1 1/4	4	4	1 1/4	1 1/4	V	14	2 1/4	15	1 1/4	37 1/2	2 1/2	F	53 1/4	2 1/2	2	2	38 1/4	2 1/2	2	2	108	33 1/4	
Dependable C-2	4	4	1 1/4	1 1/4	V	10	2 1/4	15	1 1/4	37 1/2	2 1/2	F	53 1/4	2 1/2	2	2	38 1/4	2 1/2	2	2	121	33	
Dependable D-2 1/2	4	4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2 1/2	F	53 1/4	2 1/2	2	2	38 1/4	2 1/2	2	2	140	33	
Dependable E-3	4	4	1 1/4	1 1/4	V	10	2 1/4	11 1/2	1 1/4	37 1/2	2 1/2	F	53 1/4	2 1/2	2	2	38 1/4	2 1/2	2	2	152	33	
Dependable G-3 1/2	4	4	1 1/4	1 1/4	V	13	2 1/4	13	1 1/4	37 1/2	2 1/2	F	63	2 1/2	2	2	49	2 1/2	2	2	170	35	
Diamond T-O3-1-1 1/4	3	3	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	48	2 1/2	2	2	33	2 1/2	2	2	100	34	
Diamond T-FS&T-1 1/2	3	3	1 1/4	1 1/4	V	9	1 1/4	6	1 1/4	35	2	F	11 1/2	3 1									

Replacement Table—Continued

Name, Model and Tonnage	ENGINE											BRAKE LINING							FRAME			
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service				Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Gersix M-1½	4	1½	1½	1½	H	12	2	14	1½	36	2	F	46	2	2½	2	46	2	1½	2	114	32
Gersix L-3	4	1½	1½	1½	H	13	2	16	1½	36	2	F	56	2	2½	2	56	2	1½	2	140	36½
Giant 16-2½	3	1½	1½	1½	V	7	1½	11½	1½	36½	3½	F	13	3½	3½	8	13	3½	1½	8	140½	33
Giant 17-3½	3	1½	1½	1½	V	9	1½	12	1½	36	3	F	15	3½	3½	8	15	3½	1½	8	183½	36
G.M.C. K-16	4	1½	1½	1½	V	8	1½	8	1½	35½	3½	V	49	2½	2½	2	47	2½	1½	2	191	33
G.M.C. K-20	4	1½	1½	1½	V	10	1½	10	1½	37	3½	V	49	2½	2½	2	47	2½	1½	2	Opt	33
G.M.C. K-41	4	1½	1½	1½	V	10	1½	10	1½	37½	3½	V	13	3½	3½	4	13	3½	1½	4	Opt	38
G.M.C. K-71	4	1½	1½	1½	V	11	1½	11	1½	37½	3½	V	15½	3½	3½	4	15½	3½	1½	4	Opt	38
G.M.C. K-101	4	1½	1½	1½	V	11	1½	11	1½	37½	3½	V	17½	3½	3½	4	17½	3½	1½	4	Opt	38
Gramm-Pioneer 10 Speed-1	3	1	1	1	V	12	2	14	1½	29	1	V	48	2	2	2	26	2	1½	1	97	30½
Gramm-Pioneer 15-1½-2	3	1	1	1	V	10½	2	6	2	39	1½	F	48½	2	2	2	45½	1½	1½	2	120	32
Gramm-Pioneer 65-1½-2	3	1	1	1	V	10½	2	6	2	39	1½	F	19½	1½	1½	4	19½	1½	1½	4	120	32
Gramm-Pioneer 20-2-2½	3	1	1	1	V	4½	2	12	1½	32	2	F	45	2	2	4	45	2	1½	4	126	32
Gramm-Pioneer 30-3	3	1	1	1	V	11	1½	9	1½	33	2	F	22½	2½	2½	4	22½	2½	1½	4	129½	36
Gramm-Pioneer 75P-3½	3	1	1	1	V	11	1½	9	1½	33	2	F	22½	2½	2½	4	22½	2½	1½	4	129½	36
Gramm-Pioneer 40-4	3	1	1	1	V	11	1½	9	1½	33	2	F	28	2½	2½	4	28	2½	1½	4	144	36
Gramm-Pioneer 50-5-6	3	1	1	1	V	23½	2	13½	1½	40	2	F	32	2½	2½	4	32	2½	1½	4	132	36
G. W. W.	3	1	1	1	V	12	1½	11	1½	37	2	F	49	2½	2½	2	47	2½	1½	2	89	32
Hall 2-Worm-2½	3	1	1	1	V	8	1½	12½	1½	32	1½	F	11½	3	3	4	11½	3	1½	4	144	38
Hall 3½-Worm	3	1	1	1	V	12½	1½	15½	1½	38½	1½	F	15	3½	3½	4	15	3½	1½	4	180	39
Hall 5-Worm	3	1	1	1	V	12½	1½	15½	1½	38½	1½	F	18	4	4	4	18	4	1½	4	144	39
Hall 7-Chain	3	1	1	1	V	12½	1½	15½	1½	38½	1½	F	18	4	4	4	18	4	1½	4	144	39
Harvey WOA-2	4	1½	2	2	V	11	2	14	1½	35½	2	F	45	2	2	2	45	2	1½	2	139	32
Harvey WFA-2½	4	1½	2	2	V	11	2	14	1½	35½	2	F	50	2½	2½	2	50	2½	1½	2	108	35
Harvey WHA-3½	4	1½	2	2	V	12	2	14	1½	35½	2	F	56½	2½	2½	2	56½	2½	1½	2	85	32
Harvey WFT-6	4	1½	2	2	V	11	2	14	1½	35½	2	F	50	2½	2½	2	50	2½	1½	2	93	35
Harvey WHT-10	4	1½	2	2	V	12	2	14	1½	35½	2	F	56½	2½	2½	2	56½	2½	1½	2	85	32
Hawkeye O	4	1½	2	2	V	12	2	9	1½	35½	2	F	56½	2½	2½	2	56½	2½	1½	2	93	35
Hawkeye K	4	1½	2	2	V	12	2	9	1½	35½	2	F	56½	2½	2½	2	56½	2½	1½	2	93	35
Hawkeye M	4	1½	2	2	V	12	2	9	1½	35½	2	F	56½	2½	2½	2	56½	2½	1½	2	93	35
Hawkeye N	4	1½	2	2	V	12	2	9	1½	35½	2	F	56½	2½	2½	2	56½	2½	1½	2	93	35
Hendrickson N-2½	3	1	1	1	V	14	2½	12	1½	2½	2½	F	12	3½	3½	4	12	3½	1½	4	Opt	32½
Hendrickson M-3½	3	1	1	1	V	9	2	7	2	32	1½	R	18	1½	1½	2	18	1½	1½	2	Opt	38
Hendrickson K-5	3	1	1	1	V	9	2	7	2	32	1½	R	18	1½	1½	2	18	1½	1½	2	Opt	38
Higrade A18-1	3	1	1	1	V	9	2	7	2	32	1½	R	18	1½	1½	2	18	1½	1½	2	85	32
Higrade B20-1½	3	1	1	1	V	9	2	7	2	32	1½	R	18	1½	1½	2	18	1½	1½	2	100	32
Hurlburt A1½-2	3	1	1	1	V	9	2	7	2	32	1½	R	22	2	2	2	22	2	1½	2	132	35½
Hurlburt B2½	3	1	1	1	V	9	2	7	2	32	1½	R	24	2½	2½	2	24	2½	1½	2	154	34
Hurlburt C3½-4	3	1	1	1	V	9	2	7	2	32	1½	R	26	3	3	2	26	3	1½	2	144½	34
Hurlburt D5-5½	3	1	1	1	V	9	2	7	2	32	1½	R	28	3	3	2	28	3	1½	2	144½	34
Huron-Erie 1½	4	1½	1	1	V	17	1½	14	1½	38½	1	F	15	3	3	2	15	3	1½	2	121	33
Huron-Michigan 2½	4	1½	1	1	V	17	1½	14	1½	38½	1	F	15	3	3	2	15	3	1½	2	145	33
Indiana 12-1½	3	1	1	1	V	6	1½	13	1½	26	1½	F	44	2	2	2	44	2	1½	2	108	32
Indiana 20-2	3	1	1	1	V	6	1½	13	1½	26	1½	F	51	2½	2½	2	51	2½	1½	2	126	33
Indiana 25-2½	3	1	1	1	V	6	1½	13	1½	26	1½	F	56	2½	2½	2	56	2½	1½	2	138	33
Indiana 35-3½	3	1	1	1	V	6	1½	13	1½	26	1½	F	68	3	3	2	68	3	1½	2	144	34
Indiana 51-5	3	1	1	1	V	10	1½	17½	1½	26	1½	F	88	3	3	2	88	3	1½	2	156	37½
International S-2000 lbs.-Speed Tr	3	1	1	1	V	9½	2	17½	1½	30½	1	F	38	2	2	2	36	2	1½	2	90	34
International 21-2000 lbs.	3	1	1	1	V	6	1½	13	1½	30½	1	F	43	2½	2½	2	43	2½	1½	2	106½	34
International 31-3000 lbs.	3	1	1	1	V	6	1½	13	1½	30½	1	F	43	2½	2½	2	43	2½	1½	2	111	32½
International 41-4000 lbs.	3	1	1	1	V	6	1½	13	1½	30½	1	F	50	2½	2½	2	50	2½	1½	2	217½	34
International 52-Bus	4	1½	1	1	V	9	2	14½	2	38½	1½	F	50	2½	2½	2	50	2½	1½	2	118	34
International 61-6000 lbs.	4	1½	1	1	V	9	2	14½	2	38½	1½	F	50	2½	2½	2	50	2½	1½	2	118	34
International 162 Tractor Truck	4	1½	1	1	V	9	2	14½	2	38½	1½	F	73	2½	2½	2	73	2½	1½	2	147½	34
International 101-10,000	4	1½	1	1	V	9	2	14½	2	38½	1½	F	73	2½	2½	2	73	2½	1½	2	147½	34
International 102 Tractor Truck	4	1½	1	1	V	9	2	14½	2	38½	1½	F	73	2½	2½	2	73	2½	1½	2	147½	34
Jackson B-3½	3	1	1	1	V	11	1½	11	1½	32½	1½	F	58½	3	3	2	58½	3	1½	2	156	36
Kalamazoo G-1	3	1	1	1	V	15½	1½	8	1½	40	1½	F	50	2½	2½	2	50	2½	1½	2	120	32½
Kalamazoo LG	3	1	1	1	V	6	1½	16	1½	39	2	F	50	2½	2½	2	50	2½	1½	2	120	32½
Kalamazoo NH	3	1	1	1	V	20	1½	19½	1½	42	2	F	52	2½	2½	2	52	2½	1½	2	144	33
Kalamazoo HD	3	1	1	1	V	20	1½	19½	1½	42	2	F	52									

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency			Length	Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Luedinghaus K2	3	3	1 1/4	1 1/4	V	9	1 1/4	5	1 1/4	1 1/4	1 1/4	F	53.4	2 1/4	1 1/4	2	38 1/2	2 1/4	1 1/4	2	120	34
Luedinghaus K2-LS	3	3	1 1/4	1 1/4	V	9	1 1/4	5	1 1/4	1 1/4	1 1/4	F	53.4	2 1/4	1 1/4	2	38 1/2	2 1/4	1 1/4	2	145 1/2	34
Maccar L	4	4	1 1/4	1 1/4	V	11 1/4	1 1/4	17	1 1/4	1 1/4	1 1/4	F	11 1/4	3 1/4	1 1/4	4	11 1/4	3 1/4	1 1/4	4	128 1/2	34
Maccar HA	4	4	1 1/4	1 1/4	V	9 1/4	1 1/4	15 1/4	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	4	13 1/4	3 1/4	1 1/4	4	143 1/2	34
Maccar H 2	4	4	1 1/4	1 1/4	V	10 1/4	1 1/4	15 1/4	1 1/4	1 1/4	1 1/4	F	14 1/4	3 1/4	1 1/4	4	14 1/4	3 1/4	1 1/4	4	141 1/2	34
Maccar M-3	4	4	1 1/4	1 1/4	V	11 1/4	1 1/4	20 1/4	1 1/4	1 1/4	1 1/4	F	18	4	1 1/4	4	18	4	1 1/4	4	155 1/2	34
Maccar G	4	4	1 1/4	1 1/4	V	12	1 1/4	21	1 1/4	1 1/4	1 1/4	F	70	3	1 1/4	4	34	3	1 1/4	4	166 1/2	37 1/2
MacDonald A-7 1/2	3	3	1 1/4	1 1/4	V	7 1/4	1 1/4	5 1/4	1 1/4	1 1/4	1 1/4	F	12 1/4	3 1/4	1 1/4	2	16 1/4	2 1/4	1 1/4	4	Opt	33 1/2
Mack AB-1 1/2, 2, 2 1/2-Ton-Chain	3	3	1 1/4	1 1/4	V	7 1/4	1 1/4	5 1/4	1 1/4	1 1/4	1 1/4	F	18 1/4	3 1/4	1 1/4	4	16 1/4	2 1/4	1 1/4	4	Opt	33 1/2
Mack Dual Reduction-1 1/2-2 1/2	3	3	1 1/4	1 1/4	V	7 1/4	1 1/4	5 1/4	1 1/4	1 1/4	1 1/4	F	12 1/4	3 1/4	1 1/4	4	16 1/4	2 1/4	1 1/4	4	Opt	33 1/2
Mack AB-Tractor 5 Ton	3	3	1 1/4	1 1/4	V	5 1/4	1 1/4	3 1/4	1 1/4	1 1/4	1 1/4	F	16 1/4	3	1 1/4	4	20 1/4	3 1/4	1 1/4	4	Opt	37 1/2
Mack AC-3 1/2 to 7 1/2 Ton	3	3	1 1/4	1 1/4	V	5 1/4	1 1/4	3 1/4	1 1/4	1 1/4	1 1/4	F	16 1/4	3	1 1/4	4	20 1/4	3 1/4	1 1/4	4	Opt	37 1/2
Mack AC-Tractor 7 to 15 Ton	3	3	1 1/4	1 1/4	V	11 1/4	1 1/4	14 1/4	1 1/4	1 1/4	1 1/4	F	74 1/4	2 1/4	1 1/4	1	74 1/4	2 1/4	1 1/4	1	84 1/4	30 1/2
Mason Road King	3	3	1 1/4	1 1/4	H	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	12	3 1/4	1 1/4	2	53 1/4	3 1/4	1 1/4	2	Opt	34 1/2
Master JI-1 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	74 1/4	3 1/4	1 1/4	2	Opt	34 1/2
Master JW-1 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	74 1/4	3 1/4	1 1/4	2	Opt	34 1/2
Master JD	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	74	2 1/4	1 1/4	1	74 1/4	2 1/4	1 1/4	1	156 1/4	34
Master M-2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	75 1/4	2 1/4	1 1/4	2	74 1/4	2 1/4	1 1/4	2	156 1/4	34
Master O 2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	13 1/4	3 1/4	1 1/4	2	156 1/4	34
Master W-2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	13 1/4	3 1/4	1 1/4	2	156 1/4	34
Master WL-2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	54 1/4	3 1/4	1 1/4	2	156 1/4	34
Master D-2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	54 1/4	3 1/4	1 1/4	2	Opt	34 1/2
Master DL-2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	54 1/4	3 1/4	1 1/4	2	Opt	34 1/2
Master DD-2 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	12 1/4	1 1/4	1 1/4	1 1/4	F	74 1/4	2 1/4	1 1/4	1	74 1/4	2 1/4	1 1/4	1	72 1/4	34
Master T-6 Tractor	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	16	3 1/4	1 1/4	2	23	4	1 1/4	4	147 1/4	36 1/2
Master A-3 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	Opt	36 1/2
Master AL-3 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	183 1/4	36 1/2
Master F-3 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	162 1/4	39
Master Y-4	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	162 1/4	39
Master EL-3 1/2	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	162 1/4	39
Master B-5	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	162 1/4	39
Master BL-5	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	23	4	1 1/4	4	162 1/4	39
Master F-5	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	54 1/4	3 1/4	1 1/4	2	Opt	34 1/2
Master FL-5	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	8 1/4	4 1/4	1 1/4	2	54 1/4	3 1/4	1 1/4	2	72 1/4	34
Master DDT-6	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	31	1 1/4	1 1/4	4	19 1/4	1 1/4	1 1/4	4	102 1/4	36
Master DT-6 Tractor	4	4	1 1/4	1 1/4	V	13 1/4	1 1/4	15	1 1/4	1 1/4	1 1/4	F	11	2 1/4	1 1/4	4	11	2 1/4	1 1/4	4	122	32
Maxwell 1 1/2	3	3	1 1/4	1 1/4	V	6	1 1/4	12	1 1/4	1 1/4	1 1/4	F	13 1/4	3 1/4	1 1/4	2	42 1/4	3 1/4	1 1/4	2	146	32
Menominee Hurryton-1	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	10 1/4	1 1/4	1 1/4	1 1/4	F	47 1/4	2 1/4	1 1/4	2	33 1/4	2 1/4	1 1/4	2	102 1/4	32
Menominee H-1 1/2	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	10 1/4	1 1/4	1 1/4	1 1/4	F	69 1/4	3 1/4	1 1/4	2	52	3 1/4	1 1/4	2	149	38
Menominee D-2	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	10 1/4	1 1/4	1 1/4	1 1/4	F	15 1/4	3 1/4	1 1/4	4	20	3 1/4	1 1/4	4	108	32
Menominee HT-1 1/2	3	3	1 1/4	1 1/4	V	10 1/4	1 1/4	11 1/4	1 1/4	1 1/4	1 1/4	F	21	2 1/4	1 1/4	4	20	2 1/4	1 1/4	4	108	34
Menominee J-5	3	3	1 1/4	1 1/4	V	8 1/4	1 1/4	11 1/4	1 1/4	1 1/4	1 1/4	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	132	34
Menominee G-3 1/2	3	3	1 1/4	1 1/4	V	8 1/4	1 1/4	11 1/4	1 1/4	1 1/4	1 1/4	F	12	3 1/4	1 1/4	4	12	3 1/4	1 1/4	4	174	34
Moline 10	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	13 1/4	1 1/4	1 1/4	1 1/4	F	16	3 1/4	1 1/4	4	16	3 1/4	1 1/4	4	192	38
Moreland BX-1 1/2	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	13 1/4	1 1/4	1 1/4	1 1/4	F	21	4	1 1/4	1	30	2 1/4	1 1/4	1	100 1/4	35 1/2
Moreland EX-2	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	13 1/4	1 1/4	1 1/4	1 1/4	F	21	4	1 1/4	1	30	2 1/4	1 1/4	1	100 1/4	35 1/2
Moreland AX-3	3	3	1 1/4	1 1/4	V	9 1/4	1 1/4	13 1/4	1 1/4	1 1/4	1 1/4	F	49 1/4	3 1/4	1 1/4	2	20 1/4	3 1/4	1 1/4	2	118 1/4	31 1/2
Moreland RX-5	3	3	1 1/4																			

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service				Emergency			Length	Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Parker M20-5.	3	3/4	1 1/2	1 1/2	V	14	1 1/2	18	1 1/2	40 1/2	2	F	10 1/2	5	1 1/2	2	24 1/2	4	1 1/2	4	145	37
Patriot Revere-1.	3	3/4	1 1/2	1 1/2	V	8	1 1/2	9	1 1/2	39	2	F	40 1/2	5	1 1/2	1	40 1/2	4	1 1/2	1	93	66
Patriot Lincoln Special-2.	3	3/4	1 1/2	1 1/2	V	6	1 1/2	8	1 1/2	37	2	F	40 1/2	5	1 1/2	1	40 1/2	4	1 1/2	1	113	67 1/2
Patriot Washington Special-3.	3	3/4	1 1/2	1 1/2	V	11	1 1/2	10	1 1/2	39	2	F	58	2 1/2	2 1/2	2	43	2 1/2	2 1/2	2	150	67 1/2
Pierce Arrow-2-X-5.	3	3/4	1 1/2	1 1/2	V	16 1/2	2 1/2	14 1/2	2 1/2	43 1/2	1 1/2	F	22 1/2	2 1/2	2 1/2	6	22 1/2	4 1/2	4 1/2	4	125 1/2	34 1/2
Pierce Arrow-3 1/2-W-2.	3	3/4	1 1/2	1 1/2	V	11	2 1/2	15 1/2	2 1/2	43 1/2	1 1/2	F	9 1/2	6	1 1/2	6	18	4 1/2	4 1/2	4	133 1/2	38 1/2
Pierce Arrow-5-R-10.	3	3/4	1 1/2	1 1/2	V	11	2 1/2	15 1/2	2 1/2	43 1/2	1 1/2	F	14	1 1/2	2 1/2	6	20 1/2	4 1/2	4 1/2	4	139 1/2	38 1/2
Pioneer 59AA-1.	3	3/4	1 1/2	1 1/2	V	13	2 1/2	12	2 1/2	35	1	F	52	2 1/2	2 1/2	4	52	2 1/2	2 1/2	4	102	30
Pittsburgher 2 1/2.	3	3/4	1 1/2	1 1/2	V	8	1 1/2	12	1 1/2	37	1	F	26	2 1/2	2 1/2	4	26	2 1/2	2 1/2	4	136	33
Power F-2.	3	3/4	1 1/2	1 1/2	V	6	1 1/2	12 1/2	1 1/2	39 1/2	2	F	44 1/2	2 1/2	2 1/2	1	44 1/2	2 1/2	2 1/2	1	113	34
Rainier R-8-2.	3	3/4	1 1/2	1 1/2	V	5	1 1/2	13	1 1/2	41	1 1/2	F	19	2	2 1/2	2	19	2	2 1/2	2	100	34
Rainier R-6-1 1/2.	3	3/4	1 1/2	1 1/2	V	9 1/2	1 1/2	14 1/2	1 1/2	42	1 1/2	F	19	2	2 1/2	2	19	2	2 1/2	2	113	34
Rainier R-19-1.	3	3/4	1 1/2	1 1/2	V	8 1/2	1 1/2	14	1 1/2	41	1 1/2	F	19	2	2 1/2	2	19	2	2 1/2	2	100	34
Rainier R-11-1 1/2.	3	3/4	1 1/2	1 1/2	V	9	1 1/2	14 1/2	1 1/2	42	1 1/2	F	19	2	2 1/2	2	19	2	2 1/2	2	90	34
Ranger TK-20-2.	3	3/4	1 1/2	1 1/2	V	11 1/2	1 1/2	10	1 1/2	33 1/2	1 1/2	F	11 1/2	3	3 1/2	2	11 1/2	3 1/2	3 1/2	2	106 1/2	33
Reliance 10A-1 1/2.	4	1 1/2	1 1/2	1 1/2	V	10 1/2	2 1/2	13 1/2	1 1/2	35	2	F	17	2	2	4	17	2	2	4	122	32
Reliance 20B-2 1/2.	4	1 1/2	1 1/2	1 1/2	V	10 1/2	2 1/2	13 1/2	1 1/2	35	2	F	17	2	2	4	17	2	2	4	127	32
Reo F-1500-2500 lbs.	3	3/4	1 1/2	1 1/2	V	5 1/2	1	5 1/2	1	39 1/2	1 1/2	F	43	2 1/2	2 1/2	1	39 1/2	2 1/2	2 1/2	1	82	30
Republic 10-1-10E-1.	3	3/4	1 1/2	1 1/2	V	12 1/2	2	6	2	40 1/2	1 1/2	F	21 1/2	2 1/2	2 1/2	4	19 1/2	2 1/2	2 1/2	4	118	34
Republic 11X-1 1/2.	3	3/4	1 1/2	1 1/2	V	12 1/2	2	6	2	40 1/2	1 1/2	F	25 1/2	2 1/2	2 1/2	4	24 1/2	2 1/2	2 1/2	4	121	34
Republic 19-2 1/2.	3	3/4	1 1/2	1 1/2	V	8	1 1/2	11 1/2	1 1/2	36 1/2	1 1/2	F	55 1/2	3 1/2	3 1/2	2	30 1/2	4 1/2	4 1/2	2	146	37
Republic 20-3 1/2.	3	3/4	1 1/2	1 1/2	V	12	2 1/2	13 1/2	2 1/2	31 1/2	1 1/2	F	19	2	2 1/2	4	18	2	2 1/2	4	95	31
Republic Rapid Transit-3 1/2.	3	3/4	1 1/2	1 1/2	V	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/2	F	19	2	2 1/2	4	19	2	2 1/2	4	113	33
Rowe CW-1 1/2.	3	3/4	1 1/2	1 1/2	V	20	1 1/2	15 1/2	1 1/2	32 1/2	2 1/2	F	24	2 1/2	2 1/2	4	24	2 1/2	2 1/2	4	123	33
Rowe CDW-2.	4	1 1/2	1 1/2	1 1/2	V	20	1 1/2	15 1/2	1 1/2	32 1/2	2 1/2	F	24	2 1/2	2 1/2	4	24	2 1/2	2 1/2	4	123	33
Rowe CDW-2 1/2.	3	3/4	1 1/2	1 1/2	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2 1/2	F	24	2 1/2	2 1/2	4	24	2 1/2	2 1/2	4	140	33
Rowe GSW-3.	3	3/4	1 1/2	1 1/2	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2 1/2	F	56 1/2	2 1/2	2 1/2	2	56 1/2	2 1/2	2 1/2	2	146	36
Rowe HW-4.	3	3/4	1 1/2	1 1/2	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2 1/2	F	68	3	3	2	68	3	3	2	153	38 1/2
Rowe FW-5.	3	3/4	1 1/2	1 1/2	V	10	1 1/2	15 1/2	1 1/2	37	2	F	24	2 1/2	2 1/2	4	24	2 1/2	2 1/2	4	152	33
Rowe GPW-3.	3	3/4	1 1/2	1 1/2	V	10 1/2	1 1/2	10 1/2	1 1/2	37	2	F	18	2	2 1/2	4	18	2	2 1/2	4	122	34
Rumely A-1 1/2.	4	1 1/2	1 1/2	1 1/2	V	6 1/2	1 1/2	7 1/2	1 1/2	35	1 1/2	F	37	2	2 1/2	1	35 1/2	1 1/2	1 1/2	1	108 1/2	39 1/2
Samson 15-1 1/2.	3	3/4	1 1/2	1 1/2	V	6 1/2	1 1/2	7 1/2	1 1/2	35	1 1/2	F	37	2	2 1/2	1	37 1/2	1 1/2	1 1/2	1	108 1/2	39 1/2
Samson 25-1 1/2.	3	3/4	1 1/2	1 1/2	V	1	1	1	1	40	1	F	22 1/2	2 1/2	2 1/2	4	22 1/2	2 1/2	2 1/2	4	120	32
Sanford W15-1 1/2.	3	3/4	1 1/2	1 1/2	V	1	1	1	1	40	1	F	22 1/2	2 1/2	2 1/2	4	22 1/2	2 1/2	2 1/2	4	144	35
Sanford 25-2 1/2.	3	3/4	1 1/2	1 1/2	V	1	1	1	1	40	1	F	55 1/2	2 1/2	2 1/2	2	55 1/2	2 1/2	2 1/2	2	144	35
Sanford 35-3 1/2.	3	3/4	1 1/2	1 1/2	V	1	1	1	1	40	1	F	65	2	2	2	65	2	2	2	144	35
Sanford 50-5.	3	3/4	1 1/2	1 1/2	V	11	2	14	1 1/2	37 1/2	2	F	8 1/2	3	3	4	13 1/2	3	3	4	140	35 1/2
Schacht F-2.	4	1 1/2	1 1/2	1 1/2	H	11	2	14	1 1/2	37 1/2	2	F	8 1/2	3	3	4	13 1/2	3	3	4	140	35 1/2
Schacht F-3.	4	1 1/2	1 1/2	1 1/2	H	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	F	8 1/2	3	3	4	15	4	4	4	152	35 1/2
Schacht E-4.	4	1 1/2	1 1/2	1 1/2	H	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	F	8 1/2	3	3	4	15	4	4	4	152	35 1/2
Schacht E-5.	4	1 1/2	1 1/2	1 1/2	H	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	F	8 1/2	3	3	4	15	4	4	4	152	35 1/2
Schacht E-7.	4	1 1/2	1 1/2	1 1/2	H	10 1/2	2	13 1/2	1 1/2	39 1/2	1 1/2	F	8 1/2	3	3	4	15	4	4	4	152	35 1/2
Schwartz A-1.	3	3/4	1 1/2	1 1/2	V	9 1/2	2 1/2	13	2 1/2	29 1/2	1 1/2	F	15 1/2	3 1/2	3 1/2	4	15 1/2	4	4	4	152	35 1/2
Schwartz K-2.	4	1 1/2	1 1/2	1 1/2	V	10	2 1/2	15	2 1/2	33 1/2	2	F	20 1/2	2 1/2	2 1/2	2	20 1/2	2 1/2	2 1/2	2	120	34
Schwartz LS-L-LL-3.	4	1 1/2	1 1/2	1 1/2	H	10 1/2	2	18	1 1/2	33 1/2	2	F	51 1/2	2 1/2	2 1/2	2	51 1/2	2 1/2	2 1/2	2	176	34
Schwartz MS-M-ML-5.	4	1 1/2	1 1/2	1 1/2	H	12 1/2	2	17	1 1/2	38 1/2	2	F	69 1/2	3	3	2	69 1/2	3	3	2	153	37 1/2
Selden Unit 30.	3	3/4	1 1/2	1 1/2	V	12	2	17	1 1/2	41	1 1/2	F	11 1/2	3 1/2	3 1/2	4	11 1/2	3 1/2	3 1/2	4	114	34
Selden Unit 50.	3	3/4	1 1/2	1 1/2	V	3 1/2	1 1/2	12	1 1/2	31	1 1/2	F	13	3 1/2	3 1/2	4	13	3 1/2	3 1/2	4	134	34
Selden Unit 31.	3	3/4	1 1/2	1 1/2	V	3 1/2	1 1/2	12	1 1/2	31	1 1/2	F	13	3 1/2	3 1/2	4	13	3 1/2	3 1/2	4	176	34
Selden Unit 70.	3	3/4	1 1/2	1 1/2	V	9 1/2	2 1/2	15 1/2	2 1/2	34 1/2	2	F	15 1/2	3 1/2	3 1/2	4	15 1/2	4				

Replacement Table - Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING							FRAME				
	Piston Rings		Carburetor			Upper Hose		Lower Hose		Fan Belt			Service			Emergency				Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
Traffic C-4000	3	1 1/4	1 1/4	1 1/4	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1 1/4	2	38	1 1/4	1 1/4	2	120 1/2	42
Traffic 6000	3	1 1/4	1 1/4	1 1/4	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1 1/4	2	47	1 1/4	1 1/4	2	120 1/2	34
Traffic Speedboy	3	1 1/4	1 1/4	1 1/4	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	43 1/2	2 1/2	1 1/4	2	38	1 1/4	1 1/4	2	86	34
Transport 15-1	3	1 1/4	1 1/4	1 1/4	H	10 1/2	2	10 1/2	2	41 1/4	1 1/4	F	48	2 1/2	1 1/4	2	46 1/2	1 1/4	1 1/4	2	100 1/2	34
Transport 25-1 1/2	3	1 1/4	1 1/4	1 1/4	H	12	2	12	2	36 1/2	1 1/4	F	48 1/2	3 1/2	1 1/4	2	46 1/2	1 1/4	1 1/4	2	116 1/2	34
Transport 35-2	3	1 1/4	1 1/4	1 1/4	H	10 1/2	2	10 1/2	2	40 1/2	1 1/4	F	48 1/2	3 1/2	1 1/4	2	48 1/2	1 1/4	1 1/4	2	123 1/2	34
Transport 60-3 1/2	4	1 1/4	1 1/4	1 1/4	V	9 1/2	2	10	1 1/4	32 1/2	2	F	10 1/4	3 1/2	1 1/4	2	58	2 1/2	2 1/2	2	150 1/2	36 1/2
Transport 75-5	4	1 1/4	1 1/4	1 1/4	V	12	2	16	1 1/4	35 1/2	2	F	11 1/4	3 1/2	1 1/4	2	58	2 1/2	2 1/2	2	123 1/2	34
Transport 55-3	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	16	1 1/4	31 1/2	1 1/4	F	10 1/4	3 1/2	1 1/4	2	50	2	2 1/2	2	117	34
Traylor B-1 1/2	4	1 1/4	1 1/4	1 1/4	V	...	...	...	...	38	1	F	50	2 1/2	1 1/4	2	50	2	2 1/2	2	122	34
Traylor C-2 2 1/2	4	1 1/4	1 1/4	1 1/4	V	...	...	...	...	36	2	F	56 1/2	2 1/2	1 1/4	2	50 1/2	2 1/2	2 1/2	2	142	34
Traylor D-3 3 1/2	4	1 1/4	1 1/4	1 1/4	V	...	...	...	...	37	1	F	59	2 1/2	1 1/4	2	59	2 1/2	2 1/2	2	165	35
Traylor F-5-6	4	1 1/4	1 1/4	1 1/4	V	...	...	...	...	34	1	F	22	2 1/2	1 1/4	2	41	2	2 1/2	2	94	35
Triangle AA-1	3	1 1/4	1 1/4	1 1/4	H	17	2	17	2	34	1 1/4	F	7	4	1 1/4	2	49	2	2 1/2	2	126	34
Triangle A-1 1/2	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/4	F	7	4	1 1/4	2	52	2	2 1/2	2	132	34
Triangle B-2 1/2	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	18	1 1/4	39 1/4	1 1/4	F	7	4	1 1/4	2	52	2	2 1/2	2	129	34
Triangle C-2	3	1 1/4	1 1/4	1 1/4	V	14	1 1/4	14 1/2	1 1/4	39 1/4	1 1/4	F	7	4	1 1/4	2	52	2	2 1/2	2	120	34 1/2
Triumph HB-2 1/2	4	1 1/4	1 1/4	1 1/4	V	9	1 1/2	17	1 1/4	32 1/2	2	F	46	2 1/2	1 1/4	2	32	2 1/2	2 1/2	2	120	34 1/2
Triumph HC-2	4	1 1/4	1 1/4	1 1/4	V	9	1 1/2	17	1 1/4	32 1/2	2	F	46	2 1/2	1 1/4	2	32	2 1/2	2 1/2	2	120	34 1/2
Ultimate A-2	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	20	2 1/2	1 1/4	2	45	2	2 1/2	2	126	32 1/2
Ultimate AJ2	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	20	2 1/2	1 1/4	2	45	2	2 1/2	2	126	32 1/2
Ultimate AJL-2	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	20	2 1/2	1 1/4	2	45	2	2 1/2	2	150	32 1/2
Ultimate B-3	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	1 1/4	2	51	2 1/2	2 1/2	2	144	32 1/2
Ultimate BL3	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	1 1/4	2	51	2 1/2	2 1/2	2	192	32 1/2
Ultimate D-5	4	1 1/4	1 1/4	1 1/4	V	11	2	8	1 1/4	34	2	F	51	2 1/2	1 1/4	2	51	2 1/2	2 1/2	2	180	32 1/2
Union FW-2 1/2	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	19 1/2	1 1/2	37 3/4	2	F	26	4 1/2	1 1/4	2	52	3	2 1/2	1	133 1/2	32
Union H-4	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	19 1/2	1 1/2	37 3/4	2	F	56 1/4	3 1/2	1 1/4	2	32	4 1/2	2 1/2	1	157 1/2	34
Union HW-4	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	19 1/2	1 1/2	37 3/4	2	F	26	4 1/2	1 1/4	2	24	4 1/2	2 1/2	2	157 1/2	34
Union JW-6	4	1 1/4	1 1/4	1 1/4	V	20	1 1/2	19 1/2	1 1/2	41 1/2	2	F	34	4	1 1/4	2	28	5	2 1/2	1	190	36
United 1 1/2	4	1 1/4	1 1/4	1 1/4	H	15	2 1/2	16	1 1/2	37 1/2	2	F	48	3	1 1/4	2	48	1 1/4	1 1/4	1	120	33
United 2 1/2	4	1 1/4	1 1/4	1 1/4	H	7	2 1/2	12	1 1/2	37 1/2	2	F	49	3	1 1/4	2	58	2 1/2	2 1/2	1	Opt	33
United 3 1/2	4	1 1/4	1 1/4	1 1/4	H	7	2 1/2	12	1 1/2	37 1/2	2	F	62	3	1 1/4	2	58	2 1/2	2 1/2	1	Opt	34
United 5	4	1 1/4	1 1/4	1 1/4	H	14 1/2	2 1/2	12	1 1/2	37 1/2	2	F	82 1/2	2 1/2	1 1/4	2	88 1/2	2 1/2	2 1/2	1	Opt	38
U.S.N.-1 1/2	3	1 1/4	1 1/4	1 1/4	H	11 1/2	2	9	1 1/4	37	1 1/4	F	50 1/2	2 1/2	1 1/4	2	46 1/2	1 1/2	2 1/2	1	120	34
U.S.N.W.-1 1/2	3	1 1/4	1 1/4	1 1/4	H	11 1/2	2	9	1 1/4	37	1 1/4	F	19 1/2	2 1/2	1 1/4	2	19 1/2	2	2 1/2	1	120	34
U.S.R.-2 1/2-3	3	1 1/4	1 1/4	1 1/4	V	10	1 1/2	10	1 1/2	35	1 1/4	F	21	2 1/2	1 1/4	2	21	2 1/2	2 1/2	1	144	34
U.S.S.-3 1/2-4	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	8	1 1/2	37	1 1/4	F	50	2 1/2	1 1/4	2	50	2 1/2	2 1/2	1	156	36
U.S.T.-5-6	4	1 1/4	1 1/4	1 1/4	V	15	2 1/2	13	1 1/2	38 1/2	2	F	62	3	1 1/4	2	33	4	2 1/2	1	168	36
U.S.U.-1 1/2	4	1 1/4	1 1/4	1 1/4	V	11 1/2	1 1/2	11 1/2	1 1/2	33	1 1/4	F	50 1/2	2 1/2	1 1/4	2	20	1 1/2	2 1/2	1	108	32
Velie 46-1 1/2	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	12	1 1/2	41 1/2	2	F	54 1/2	2 1/2	1 1/4	2	52 1/2	2 1/2	2 1/2	1	120	31
Velie 53-2 1/2	3	1 1/4	1 1/4	1 1/4	V	5 1/2	1 1/2	12 1/2	1 1/2	40 1/2	2	F	54 1/2	2 1/2	1 1/4	2	52 1/2	2 1/2	2 1/2	1	120	31
Vim 50-1 1/2-3 1/4	3	1 1/4	1 1/4	1 1/4	V	...	...	...	...	33 1/2	2	F	48	2 1/2	1 1/4	2	46 1/2	2 1/2	2 1/2	1	90	32
Walker M2	...	...	...	...	...	...	...	...	...	...	...	...	43	2 1/2	1 1/4	2	14	1 1/4	1 1/4	4	140	35
Walker P3 1/2	...	...	...	...	...	...	...	...	...	...	...	...	53 1/4	3	1 1/4	2	19 1/4	2 1/2	2 1/2	4	162	35
Walker N5	...	...	...	...	...	...	...	...	...	...	...	...	45 1/2	2 1/2	1 1/4	2	16	2	2 1/2	4	99	32
Walker 22	...	...	...	...	...	...	...	...	...	...	...	...	53 1/4	3	1 1/4	2	19 1/4	2 1/2	2 1/2	4	120	32
Walker 42	...	...	...	...	...	...	...	...	...	...	...	...	12	3 1/4	1 1/4	2	12	3 1/4	1 1/4	4	117	32
Walker Johnson A-2	3	1 1/4	1 1/4	1 1/4	V	11 1/2	2	7 1/2	1 1/2	37	1	F	13	3 1/4	1 1/4	2	13	3 1/4	1 1/4	4	133	32 1/2
Walker Johnson B3	4	1 1/4	1 1/4	1 1/4	V	10	2	8	1 1/2	33 1/2	1 1/4	F	15	5	1 1/4	2	67	2 1/2	2 1/2	4	150	36
Walter S-5	3	1 1/4	1 1/4	1 1/4	V	7	1 1/2	16	1 1/2	41 1/2	1 1/4	F	13	3 1/4	1 1/4	2	13	3 1/4	1 1/4	4	137 1/2	33
Ward LaFrance 2B-2 1/2-3 1/2	3	1 1/4	1 1/4	1 1/4	V	8 1/2	1 1/2	18	1 1/2	41 1/2	1 1/4	F	15 1/2	3 1/4	1 1/4	2	15 1/2	3 1				

KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

Engine:

Beav—Beaver
Buda
Cont—Continental
GBS—Golden, Belknap &
Gr-B—Gray-Beal [Swartz
Her—Hercules
Hin—Hinkley
H-Sp—Herschell-Spillman
LeR—Le Roi
1 Lib—Liberty
LMF—Light Mfg. & Fdy.
Lyco—Lycoming
Mid—Midwest
Sup—Supreme
Wau—Waukesha
Wei—Weidely
Wis—Wisconsin

Valve Arrangement:

H—Overhead
L—ELL-Head
2 S—Sleeve
T—TEE-Head

How Cooled:

A—Air
B—Pump & Thermo
3 C—Centrifugal
G—Gear Pump
T—Thermo-Syphon

Radiator (Make):

BW—B & W
Brm—Brenem
Bus—Bush
Can—Candler
Chic—Chicago
Eag—Eagle
EM—English-Mersick
Eur—Eureka
Fed—Fedders
Flex—Flexo
GO—G. & O.
Har—Harrison
Hoo—Hoooven
4 Idl—Ideal
Jam—Jamestown
Kue—Kuenz
Liv—Livingston
Lng—Long
McC—McCord
May—Mayo
Mod—Modine
Per—Perfex
R-T—Rome-Turney
Spar—Sparton
Spec—Special
Spli—Splitex
Stn—Standard
Whe—Wheeler

Radiator (Type):

C—Cellular
Fin—Fin Tube
5 H—Honeycomb
PT—Plain Tube
ZZT—Zig Zag Tube

Lubrication:

FS—Force and Splash
F—Force Feed
S—Splash

Carburetor:

7 Bent—Bennett
Cart—Carter
Eag—Eagle
Ens—Ensign
John—Johnson
King—Kingston

Mar—Marvel
Mas—Master
Mill—Miller
Rayf—Rayfield
Scoe—Scoe
Strm—Stromberg
Sheb—Schebler
Stew—Stewart
Till—Tillotson
Zen—Zenith

Fuel Feed:

8 G—Gravity
P—Pressure
V—Vacuum

Governor:

9 Con—Continental
Dup—Duplex
Han—Handy
Her—Hercules
Hin—Hinkley
McC—McCanna
Mon—Monarch
Phar—Pharo
Pier—Pierce
Sim—Simplex
Wau—Waukesha

Clutch (Make):

10 B.B—Borg & Beck
B-Li—Brown-Lipe
Covt—Covert
Det—Detlaff
DG—Detroit Gear & Mach.
Full—Fuller
Hart—Hartford
Hoos—Hoosier
HS—Hele-Shaw
M-E—Merchant & Evans
Mun—Muncie
T-D—Twin Disc
W-Gr—Warner Gear

Clutch (Type):

11 C—Cone
D—Disc
DD—Dry Disc
Fr—Friction
WP—Wet Plate

Ignition System:

12 ABo—American Bosch
Amr—American Swiss
Apo—Apollo
AtK—Atwater Kent
AuL—Auto-Lite
Ber—Berling
Con—Connecticut
Del—Delco
Eis—Eisemann
Kin—Kingston
KW—K. W. Ignition Co.
Lor—Lorraine
NE—North East
POL—Prest-O-Lite
Rm—Remy
RBo—Robert Bosch
Sim—Simms
Spl—Splitdorf
Tea—Teagle
Wag—Wagner
Wes—Westinghouse

Engine Starter:

13 AC—Allis-Chalmers
AK—Atwater Kent
ABo—American Bosch
AL—Auto-Lite
Bj—Bijur
DL—Delco
Dy—Dyneto
GD—Gray & Davis

LN—Leece-Neville
NE—North East
Rm—Remy
USL—U. S. L.
W—Westinghouse
Wg—Wagner

Gearset:

14 B-Li—Brown-Lipe
Cott—Cotta
Covt—Covert
Det—Detroit
Dun—Dundore
Durs—Durstun
Full—Fuller
G-Le—Grant Lees
MM—Mechanics Mach. Co.
Mun—Muncie
W-C—Warner Corporation
W-Gr—Warner Gear

Location of Gearset:

15 A—Amidships
J—Unit with jackshaft
R—Rear
U—Unit with engine

Universal:

16 Acn—Acme
Arv—Arvac
Bld—Blood-Brothers
Det—Detroit
Hart—Hartford
KB—Kinsler-Bennett
MM—Mechanics
M-E—Merchant & Evans
Nor—Norwalk
Pet—Peters
Sned—Snead
Spic—Spicer
Ster—Sterling
Ther—Thermoid
UM—Universal Machine
UP—Universal Products
Var—Varied

Springs:

17 Am—Am. Auto Parts
Arm—Armstrong
Cham—Champion
Del—Delany
Det—Detroit
GC—Garden City
Har—Harvey
IC—Iron City
Kal—Kalamazoo
Lah—Laher
Lig—Liggett
Mar—Maremont
Math—Mather
Mer—Merrill
Nat—National
Pen—Penn
Per—Perfection
Row—Rowland
Shel—Sheldon
SP—Spring Perch
Stan—Stan-Par
SS—Standard Steel
Ster—Sterling
Tut—Tuthill
US—United States
Vul—Jenkins Vulcan

Final Drive:

18 B—Bevel Gear
C—Chain
I—Internal Gear
P—Spur
R—Double Reduction
S—Spiral Bevel
W—Worm

Rear Axle (Make):

19 Col—Columbia
Clark
Dun—Dunkirk
Eat—Eaton
Fli—Flint
IrM—Iron Mt.
LM—L M Axle
Russ—Russel
Sals—Salisbury
Shel—Sheldon
Stn—Standard Parts
Thom—Thomson
Tim—Timken
Torb—Torbensen
Vul—Vulcan
Walk—Walker
Wis—Wisconsin

Rear Axle (Type):

20 Flot—Floating
D—Dead
 $\frac{1}{2}$ -Fl—Semi-Floating
 $\frac{3}{4}$ -Fl— $\frac{3}{4}$ -Floating

Steering Gear:

21 CAS—C. A. S. Products Co.
Dit—Ditwiler
Gem—Gemmer
Jac—Jacox
Lav—Lavine
M-P—Muncie Products
Ros—Ross
Sag—Saginaw Products Co.
Woh—Wohlrab

Wheels:

22 Arc—Archibald
AuW—Auto Wheel
Bim—Bimel
Bud—Budd
Cla—Clark
C&M—Crane & McMahon
Day—Dayton
Det—Detroit
Dis—Disteel
E&O—Eberly & Oris
Hay—Hayes
Hoo—Hoopes Brothers
Imp—Imperial
Jon—Jones
Kel—Kelsey
MM—Michigan Malleable
Iron Co.
Mot—Motor Wheel
Mun—Muncie Wheel
Mut—Mutual
Nor—Northern
Pru—Prudden
Roy—Royer
Sch—Schwartz
Smi—Smith
Sta—Stanwell
StM—St. Mary
Stn—Standard
Wal—Walker
Way—Wayne
W-L—Waterhouse & Lester

Rim Equipment:

23 Bak—Baker
Cle—Cleveland
Det—Detroit
Fir—Firestone
Gdy—Goodyear
Hay—Hayes
Jax—Jaxon
Kel—Kelsey
Mil—Miller

[illegible]

Independent B (two)
Indiana Highway Express
International 21
International Speed
Kearns H
Kissel Express
Kleiber AA
Larrabee-Devo X-2
Luedinghaus C
Mason Road King
Memolinee Hurryton
Moreland R-R
Napoleon 9
Nash 2018
Nelson-LeMoon G
Norwalk
O. K. 1 Ton.
Oldmobile
Parker C22
Patriot Revere
Pioneer AA (Chicago)
Rainer R-29
Republic 10
Republic 10-E
Ruggles 20
Sawdow
Sanford W-15
Schwartz A
Signal NF
Southern 10
Stoughton A
Superior D
T-Trans 15
Triangle AA
United Highway Special
Wichita K
Wilcox AA
Winther Delivery Special
Wisconsin A (Sauk City)
Wolverine J-1

1 1/4 Ton
Clydesdale 18
Commerce T
Denby 31
Dependable A
Diamond T-O3
Eagle 101
Kearns N
Menominee HT
Noble A-21
Perfection B
Reo F Speedwagon
Samson 25
Service 15
Standard 75
Stewart Utility Wagon
Stewart 15
Thomast Speed
U. S. U
Yellow Cab M42

1 1/2 Ton
Acason RB
Ace
Acme 30
Apex D
Armleder 21B
Armleder 40B
Armleder 40C
Atco B
Atco B 1
Atlas 44
Atterbury 20R
Autocar F
Autocar G
Available H
Bell E
Bessemer H2
Bridgport A
Brinton
Brookway S
Buffalo Model 9
Chicago C
Climber A-20
Clydesdale 20
Collier 19
Concord 12
Concord D-22

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET				REAR AXLE			TIRES, WHEELS, RIMS			Chassis Weight (Stripped)	Wheelbase																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Bore and Stroke	N. A. C. C. Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)	Springs (Make)	Final Drive			Make	Type	Total Gear Ratio	Total Gear Ratio in Low	Steering Gear (Make)	Front		Rim Equipment	Wheels (Make)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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† Chassis only.

Chassis Price	Make and Model (4 Cylinders unless otherwise noted)	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Gears	Universal (Make)	Sprockets (Make)	Final Drive	Make	Type	Total Gear Ratio in High	Total Gear Ratio in Low	Steering Gear (Make)	Tires, Wheels, Rims		Chassis Weight (Stripped)	Wheelbase	
3200	Buda ETU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
3000	Buda CTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2900	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2800	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2700	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2600	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2500	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2400	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2300	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2200	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2100	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
2000	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1900	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1800	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1700	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1600	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1500	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1400	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1300	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1200	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1100	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
1000	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
900	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
800	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
700	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
600	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
500	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
400	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
300	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
200	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
100	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28
0	Buda HTU	4 1/2 x 5 1/2	28.5	L	C	Own	PT	F	Zen	G	Dup	BB	DD	ABO	W	13	16	17	18	19	20	21	22	23	24	25	26	27	28

Chassis only.

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		Total Gear Ratio	Total Gear Ratio	Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight (Stripped)	Wheelbase							
		Make and Model	N.A.C.C.	Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System				Engine Starter	Make			Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Make	Type
3 Ton—Cont'd																													
Traylor D	3300	Buda HTU	4 1/2 x 5 1/2	28.9	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	5850	150							
Ultimate BL	3800	Buda HTU	4 1/2 x 5 1/2	28.9	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	5500	178							
U. S. R.	3800	Buda HTU	4 1/2 x 5 1/2	28.9	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	5500	156							
Winther RX	3900	Wm CU	4 1/2 x 5 1/2	28.9	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	5900	160							
*Winther 5L	3175	Wm FAU	4 1/2 x 5 1/2	25.2	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	5300	150							
Wolverine K3	2910	Cont K	4 1/2 x 5 1/2	27.2	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	5600	168							
3 1/2 Ton																													
Acason L	3075	Wm CU	4 1/2 x 5 1/2	30.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7000	180							
Apex F	3650	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6940	168							
Armstrong KWB	3650	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6940	156							
Armleder KWC	3650	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7500	150							
Atterbury 22DX Short	4375	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7500	174							
Atterbury 22D Std.	4375	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7500	198							
Atterbury 22D LWB	4375	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7200	170							
*Autocar Y	4200	Wm VAU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6500	176							
*Available H	4175	Her MU-3	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7000	170							
*Bridgeport 4C	3980	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6800	164							
*Brookway R	4100	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7200	168							
Chicago C	4100	Her MU-3	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7000	170							
Clydesdale 90	3150	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6600	165							
Day Elder F	3250	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7250	170							
Dependable G	3750	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6650	160							
Diamond TK	4070	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6750	194							
Dixon	4400	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6900	156							
Dorris K7	3500	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7000	162							
Duplex E	3150	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6800	176							
Federal WE	3700	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7945	163							
Gary KT	4150	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8070	187							
Giant 17	3600	G. M. C. K-71A	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7885	138							
G. M. C. K-71B	3700	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6000	Op							
G. M. C. K-71T	4225	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6500	180							
*Gramm-Pioneer 75P	3000	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6525	144							
Hal-Fur F	4000	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7000	160							
Hal-Fur F	3900	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7000	170							
Harvey WHA	3900	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7400	150							
Hendrickson N	3475	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7520	160							
Hurlock CC	3845	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7730	Op							
Indiana B	3845	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8500	Op							
Kalamazoo SK	3900	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	160							
Kelly-Springfield K-40	3900	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	160							
Kelly-Springfield K-41	3900	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7780	Op							
Kelly-Springfield K-42	4470	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	160							
Kleber C	3900	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8070	Op							
*Koehler F	3900	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8070	Op							
*Larrabee LA	4950	Cont E-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	158							
*Master AC	4090	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	158							
*Master AL	4290	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	158							
*Master EL	4300	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	8200	158							
*Master EL	4300	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6750	160							
*Memphis G	3800	Wm VAU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6000	Op							
*Nelson & LeMoon G-4	3495	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7200	152							
*Noble E-7	4200	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7300	Op							
*Old Reliable C	3975	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7300	Op							
*Old Reliable C	4250	Buda YTU	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	7300	Op							
*Packard ED	4050	Cont L-4	4 1/2 x 5 1/2	32.4	C	GO	Can	C	Sheb	Zen	G	Pier	M-E	DD	Eis	Opt	Shel	1 1/2 Fl	36x8	36x8	6350	164							
*Packard ED	4100	Cont L-4	4 1/2 x 5 1/2																										

Signal M.
Standard 60.
Sterling.
Super Truck 70.
Titan F35.
Titan.
Tower G.
Transport 60.
Twin City.
United C.
Wald T.
W & L France 4A.
W & L N.
W & L N.
White 40.
Wichita O.
Wilson E.
Willcox E.
Winter & Hirsch L.
Winter 70.
Wisconsin D (Sauk City).

4 Ton
Acme 90.
American.
Bessemer K2.
Corbitt A22.
Denby 27.
Double Drive B.
Fagol.
Garford 77D.
Gramm-Pioneer 40.
Kimball AE.
Kissel Heavy Duty.
Maccar M3.
Master Y.
Master YL.
Rowe HW.
Schlacht.
Service 77.
Union H.
Union HW.
U. S. 8.

5 Ton
Acason M.
Acme 125.
American.
Atterbury 8E.
Atterbury 8E-LWB.
Autocar B.
Available H.
Brookway T.
Chicago D5.
Clydesdale 120 B.
Corbitt A20-22.
Day-Elder E.
Denby 210.
Diamond T-EL.
Diamond T-LS.
Dixon.
D-Olt B-5.
Fagol.
Federal X2.
Garford 68 D.
Gary M.
G. M. C. K-101A.
G. M. C. 101B.
G. M. C. 101T.
Gramm-Pioneer 50-60.
Hall.
Hartford K.
Harbur DD.
Indiana 51.
International 101.
Kalamazoo OK.
Kelsay-Springfield K60.
Kimball AF.
Kleiber D.
Kleiber D.
Larrabee W.
Maccar G.
Mack AC.
Master B.
Master BL.
Master F.
Master FL.
Menominee J.
Moland & Rex.
Moland & LeMoon G.

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARBOX				REAR AXLE			TIRES, WHEELS, RIMS			Chassis Weight (Stripped)	Wheelbase											
		Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)			Springs (Make)	Final Drive	Make	Type	Total Gear Ratio	Total Gear Ratio	Steering Gear	Pneumatic (Dual Solid)		Wheels (Make)	Rim Equipment
																															Front	Rear		
5 Ton—Cont'd																																		
*Oden G	5000	Cont B-2	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Old Reliable D.	4725	Wis RAU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Oneida F	4500	Wis RAU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Packard EF	4850	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Parker M20	4850	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Pierce Arrow R10	5100	Cont B-2	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Rainier R-17	4850	Wis VAU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Rowe FW	4325	Cont E-4	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Sanford W50	4400	Wis VAU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Schacht	4900	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Schwartz MS	4900	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Schwartz M	4900	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Schwartz ML	4950	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Selden Unit 90	4950	Cont B-2	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Signal R	4400	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Standard K	4950	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Sterling Chain	5500	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Super Truck 100	4300	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Titan 5	5250	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Transport 75	3485	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Traylor F	4700	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Ultimate D	5500	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*United V	5000	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*U. S. 1	4850	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Ward La France A	4890	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*White 45	4500	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Winther 109	4520	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Winther 109	4700	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Wisconsin E (Sioux City)	3500	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Wolverine L	3690	Wau EU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
5 1/2, 6 and 7 Ton																																		
Garford 150 A-7 1/2	5200	Buda BTU	5 x 6 1/2	40	3	C	C	Chic	Fin	Fin	Strm	G	Sim	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	11.44	11.44	Ros	36x6	40x12	Wal	10200 162	
Hall 7 Chain	4850	Cont E-4	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
Hurlbert E-E	4850	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
Kelly-Springfield K-60	4800	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
Kelly-Springfield K-61	5750	Buda YTU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*MacDonald A	5750	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Mack AC 1/2	6000	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Mack AC 1/2	6000	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Mack AC 1/2	6000	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Mack AC 1/2	6000	Wau BU	4 1/2 x 6	36.1	2	C	C	Chic	Fin	Fin	Strm	G	Con	B-Li	DD	Spl	I	Wal	A	4	M-E	Tut	SP	W	W	1 1/2 Fl	10.33	10.33	Ros	36x6	40x12	Wal	8600 175	
*Mack AC 1/2																																		

ELECTRIC COMMERCIAL CARS

E. C. M.	Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
	Atlantic 1C.....	2000	2770	.....	12	Opt	.....	G-E-E	G-E-E	4	C	Timk	S-E-I	34x4	36x4	Ross	103	65
	Atlantic 2C.....	4000	3590	.....	11	Opt	.....	G-E-E	G-E-E	4	C	Timk	S-E-I	34x4	36x3 1/2	Ross	115	65
	Atlantic 3C.....	7000	5220	.....	10	Opt	.....	G-E-E	G-E-E	5	C	Timk	S-E-I	36x5	40x5 1/2	Ross	135	65
	Atlantic 5C.....	10000	6230	.....	9	Opt	.....	G-E-E	G-E-E	5	C	Timk	S-E-I	36x6	40x5 1/2	Ross	144	65
	Atlantic 6C.....	13000	6940	.....	8	Opt	.....	G-E-E	G-E-E	5	C	Timk	S-E-I	36x6	40x6	Ross	156	65
	C-T D-1.....	1000	2200	1585	14	Opt	55	G-E-E	G-E-E	4	C-T	Flot	S-E-I	36x3	36x3 1/2	W	100	69
	C-T B-1.5.....	1500	2300	1985	14	Opt	60	G-E-E	G-E-E	4	C-T	Flot	S-E-I	36x3	36x4	W	91 1/2	65
	C-T D-1.5.....	1500	2300	1985	14	Opt	60	G-E-E	G-E-E	4	C-T	Flot	S-E-I	36x3	36x4	W	116	71
	C-T B-2.....	2000	2400	2150	14	Opt	50	G-E-E	G-E-E	4	C-T	Flot	S-E-I	36x3 1/2	36x5	W	101	66
	C-T D-2.....	2000	2400	2150	14	Opt	50	G-E-E	G-E-E	4	C-T	Flot	S-E-I	36x3 1/2	36x5	W	124	70
	C-T B-4.....	4000	4000	2575	12	Opt	50	G-E-E	G-E-E	4	C-T	Flot	S-E-I	36x4	36x4 1/2	W	116	68
	C-T C-6.....	6000	4200	2575	8	Opt	35	G-E-E	G-E-E	4	I	Dead	S-E-I	36x4	36x4 1/2	W	116	70
	C-T C-7.....	7000	5000	3550	10	Opt	45	G-E-E	G-E-E	4	I	Dead	S-E-I	36x5	36x5 1/2	W	126	65
	C-T A-7.....	7000	5800	3850	11	Opt	45	G-E-E	G-E-E	4	I	Dead	S-E-I	36x6	36x4 1/2	W	122	60
	C-T A-10.....	10000	6500	3960	10	Opt	45	G-E-E	G-E-E	4	I	Dead	S-E-I	36x7	36x5 1/2	W	132	59
	Kelland A.....	1000	1850	.....	15	Opt	50	G-E-E	G-E-E	4	R	Flot	Mer	34x3	34x3	Ross	102	60
	Kelland B.....	1500	1950	.....	15	Opt	50	G-E-E	G-E-E	4	R	Flot	Mer	34x3 1/2	34x3 1/2	Ross	102	60
	Kelland C.....	2000	2150	.....	15	Opt	50	G-E-E	G-E-E	4	R	Flot	Mer	34x3 1/2	34x4	Ross	102	60
	Lansden BG 3/4.....	1400	1600	1500	15	Opt	50	G-E-E	G-E-E	4	R	Flot	SP	32x4 1/2	32x4 1/2	Lav	108	50
	Lansden MC 1.....	2000	1850	1200	12	Opt	50	G-E-E	G-E-E	4	C	D	SP	36x3	36x3 1/2	KH	108	60
	Lansden MD 2.....	4400	2250	1100	11	Opt	50	G-E-E	G-E-E	4	C	D	SP	36x4	36x3 1/2	KH	120	60
	Lansden ME 3/4.....	5700	2950	1000	10	Opt	45	G-E-E	G-E-E	4	C	D	SP	36x5	36x4 1/2	KH	133	60
	Lansden MF 5.....	7500	3350	900	9	Opt	40	G-E-E	G-E-E	4	C	D	SP	36x6	36x5 1/2	KH	146	60
	Lansden MG 6.....	8900	.....	.....	7	Opt	35	G-E-E	G-E-E	4	C	D	SP	36x7	36x6 1/2	KH	156	60
	Milburn Model 40.....	2000	1990	1985	15	Opt	40	G-E-E	G-E-E	4	W	Math	32x4 1/2	33x5	Gem	128	62	
	Milburn Model 43.....	1000	1890	1585	18	Opt	50	G-E-E	G-E-E	4	W	Math	32x4 1/2	32x4 1/2	Gem	115	56	
	Steinmetz 15.....	1500	2300	.....	16	Opt	55	Diehl	G-E-E	4	R	Russ	Shel	33x5	33x5	Lav	114	60
	Walker 23.....	2000	2500	.....	14	Opt	60	West	West	5	O	Own	Math	34x3 1/2	36x4	Ross	101	66
	Walker 42.....	4000	3700	.....	13	Opt	60	West	West	5	O	Own	Math	36x4	36x6	Ross	114	64
	Walker M 2.....	1250	2300	.....	15	Opt	60	West	West	5	O	Own	Math	34x3	36x3 1/2	Ross	94	66
	Walker N.....	10000	6300	.....	10	Opt	50	West	West	5	O	Own	Math	36x6	38x6 1/2	Ross	141	68
	Walker P.....	7000	5300	.....	11	Opt	50	West	West	5	O	Own	Math	36x5	38x5 1/2	Ross	131	66
	Walker EN.....	4000	4400	2575	15	Opt	50	G-E-E	G-E-E	5	O	Dead	.....	36x4	36x7	Gem	114	60
	Walker EL.....	7000	4550	3475	13 1/2	Opt	50	G-E-E	G-E-E	5	O	Dead	.....	36x5	36x4	Gem	130	60
	Walker ES.....	10000	7200	3975	12	Opt	50	G-E-E	G-E-E	5	O	Dead	.....	36x6	40x6	Gem	150	60
	Ward WS 2.....	1650	.....	.....	13	Opt	75	G-E-E	G-E-E	4	W	Shel	Shel	32x3	32x3 1/2	Own	88	56
	Ward WA.....	2860	.....	.....	12	Opt	52 1/2	G-E-E	G-E-E	4	W	Shel	Shel	32x3 1/2	34x4	Own	90	61
	Ward WA 2.....	2470	.....	.....	12	Opt	72 1/2	G-E-E	G-E-E	4	W	Shel	Shel	32x3 1/2	34x4	Own	90	61
	Ward WB.....	3850	.....	.....	10.5	Opt	45	G-E-E	G-E-E	4	W	Shel	Shel	34x4	36x5	Own	102	64
	Ward WB 2.....	3350	.....	.....	10.5	Opt	70	G-E-E	G-E-E	4	W	Shel	Shel	34x4	36x5	Own	102	64
	Ward WD.....	4875	.....	.....	9	Opt	50	G-E-E	G-E-E	4	W	Shel	Shel	36x5	36x7	Own	114	68
	Ward WD 2.....	4350	.....	.....	9	Opt	60	G-E-E	G-E-E	4	W	Shel	Shel	36x5	36x7	Own	114	68
	Ward WF.....	7200	.....	.....	8	Opt	40	G-E-E	G-E-E	5	W	Shel	Shel	36x6	36x10	Own	132	70
	Ward WF 2.....	6450	.....	.....	8	Opt	40	G-E-E	G-E-E	5	W	Shel	Shel	36x6	36x10	Own	132	70
	Ward WH.....	9400	.....	.....	7	Opt	38	G-E-E	G-E-E	5	W	Shel	Shel	36x7	40x12	Own	144	71
	Ward WH 2.....	8200	.....	.....	7	Opt	38	G-E-E	G-E-E	5	W	Shel	Shel	36x7	40x12	Own	144	71

Manufacturers and Models Included in Specifications on Preceding Pages

Acason—1, 1 1/2, 2 1/2, 3 1/2, 5—Acason Motor Truck Co., Detroit, Mich.
 Ace—1 1/2, 2 1/2—American Motor Truck Co., Newark, Ohio.
 Acme—1, 1 1/2, 2, 3, 4 1/2, 6 1/2—Acme Motor Truck Co., Cadillac, Mich.
 American—2 1/2, 4, 5—American Motor Truck & Tractor Co., Portland, Conn.
 Apex—1, 1 1/2, 2 1/2, 3 1/2—Hamilton Motor Co., Grand Haven, Mich.
 Armleder—1, 1 1/2, 2 1/2, 3 1/2—O. Armleder Co., Cincinnati, Ohio.
 Atco—1 1/2, 2 1/2—American Truck & Trailer Corp., Kankakee, Ill.
 Atlantic—1, 2, 3, 5, 6—Atlantic Electric Vehicle Co., Newark, N. J.
 Atlas—1, 1 1/2—Industrial Motor Corp., Rochester, N. Y.
 Atterbury—1 1/2, 2 1/2, 3 1/2, 5—Atterbury Motor Car Co., Buffalo, N. Y.
 Autocar—1 1/2, 2, 3 1/2, 5—Autocar Co., Ardmore, Pa.
 Available—1 1/2, 2, 2 1/2, 3 1/2, 5—Available Truck Co., Chicago, Ill.
 Avery—1—Avery Company, Peoria, Ill.
 Bell—1, 1 1/2, 2 1/2—Iowa Motor Truck Co., Ottumwa, Ia.
 Belmont—1, 1 1/2, 2, 3—Belmont Motors Corp., Harrisburg, Pa.
 Bessemer—1, 1 1/2, 2 1/2, 4—Bessemer Motor Truck Co., Grove City, Pa.
 Bethlehem—1, 2, 3—Bethlehem Motors Corp., Allentown, Pa.
 Betz—1, 2 1/2—Betz Motor Truck Co., Hammond, Ind.
 Birch—1—Birch Motor Cars, Chicago, Ill.
 Bridgeport—1 1/2, 2 1/2, 3 1/2—Bridgeport Motor Truck Co., Bridgeport, Conn.
 Brinton—1 1/2, 2 1/2—Brinton Motor Truck Co., Philadelphia, Pa.
 Brockway—1 1/2, 2 1/2, 3 1/2, 5—Brockway Motor Truck Co., Cortland, N. Y.
 Buffalo—1 1/2, 2 1/2, T.T.—Buffalo Truck and Tractor Corp., Clarence, N. Y.
 C. T.—1, 1 1/2, 2, 3 1/2, 5—Commercial Truck Co., Philadelphia, Pa.
 Casco—1—Casco Motors, Inc., Portland, Maine.
 Case—2—J. I. Case Plow Works Co., Racine, Wis.
 Chevrolet—1—Chevrolet Motor Co. of Mich., Flint, Mich.
 Chicago—1 1/2, 2 1/2, 3 1/2, 5—Chicago Motor Truck, Inc., Chicago, Ill.
 Climber—1 1/2—Climber Motor Corp., Little Rock, Ark.
 Clydesdale—1, 1 1/2, 2 1/2, 3 1/2, 5—Clydesdale Motor Truck Co., Clyde, Ohio.
 Collier—1, 1 1/2, 2, 2 1/2—Collier Motor Truck Co., Bellevue, Ohio.
 Commerce—1, 1 1/2, 2, 2 1/2—Commerce Motor Truck Co., Detroit, Mich.
 Concord—1 1/2, 2, 2 1/2, 3—Abbott-Downing Truck & Body Co., Concord, N. H.
 Corbitt—1, 1 1/2, 2, 2 1/2, 3, 4, 5—Corbitt Motor Truck Co., Henderson, N. C.
 Cyclone—1 1/2—The Cyclone Motor Corp., Greenville, S. C.
 Day-Elder—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Day-Elder Motors Corp., Newark, N. J.
 Dearborn—1, 1 1/2, 2—Dearborn Truck Co., Chicago, Ill.
 Defiance—1, 1 1/2, 2—Defiance Motor Truck Co., Defiance, Ohio.
 Denby—1 1/2, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.
 Dependable—1 1/2, 2, 2 1/2, 3, 3 1/2—Dependable Truck & Tractor Co., East St. Louis, Ill.
 Diamond T—1 1/2, 1 1/2, 2 1/2, 3 1/2, 5—Diamond T Motor Car Co., Chicago, Ill.

*Indicates Advertisers. See Advertisers' Index.

Diehl—1, 1 1/2—Diehl Motor Truck Works, Philadelphia, Pa.
 Dixon—3 1/2—Dixon Motor Truck Co., Altoona, Pa.
 Dodge—1—Dodge Bros., Detroit, Mich.
 D-Olt—1, 1 1/2, 2 1/2, 5—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.
 Dorris—1, 2, 3 1/2—Dorris Motor Car Co., St. Louis, Mo.
 Dort—1 1/2—Dort Motor Car Co., Flint, Mich.
 Double Drive—1—Double Drive Truck Co., Benton Harbor, Mich.
 Douglas—1 1/2, 2, 3—Douglas Motors Corp., Omaha, Neb.
 Drake—2—Drake Motor & Tire Mfg. Corp., Knoxville, Tenn.
 Duplex—2, 3 1/2—Duplex Truck Co., Lansing, Mich.
 Eagle—1 1/2, 2—Eagle Motor Truck Corp., St. Louis, Mo.
 Erie—1 1/2, 2 1/2—Erie Motor Truck Mfg. Co., Erie, Pa.
 Eugol—1—Eugol Motor Truck Co., Kenosha, Wis.
 F. W. D.—3—Four-Wheel Drive Auto Co., Clintonville, Wis.
 Facto—2 1/2—Facto Motor Trucks, Springfield, Mass.
 Fageol—2, 3, 4, 5—Fageol Motors Co., Oakland, Cal.
 Fargo—2—Fargo Motor Truck Co., Chicago, Ill.
 Federal—1, 1 1/2, 2, 3 1/2, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.
 Ford—1—Ford Motor Co., Highland Park, Mich.
 Forschler—1, 1 1/2, 2, 3—Forschler Motor Truck Mfg. Co., New Orleans, La.
 Front Drive—1 1/2—Double Drive Truck Co., Benton Harbor, Mich.
 Fulton—1, 2, T.T.—Fulton Motors Corp., Farmingdale, N. Y.
 G. M. C.—1, 2, 3 1/2, 5—General Motors Truck Co., Pontiac, Mich.
 G. W. W.—1 1/2—Wilson Truck Mfg. Co., Henderson, Ia.
 Garford—1, 1 1/2, 2 1/2, 4, 5, 7 1/2—Garford Motor Truck Co., Lima, O.
 Gary—1, 2, 2 1/2, 3 1/2, 5—Gary Motor Corp., Gary, Ind.
 Gersix—1 1/2, 2 1/2, 3—Gersix Mfg. Co., Seattle, Wash.
 Giant—2 1/2, 3 1/2—Giant Truck Corp., Chicago Heights, Ill.
 Graham—1, 1 1/2—Graham Brothers, Evansville, Ind.
 Gramm-Bernstein—1, 1 1/2, 2, 3, 3 1/2, 4, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
 Hal-Fur—2, 3 1/2—Hal-Fur Motor Truck Co., Cleveland, Ohio.
 Hall—2 1/2, 3 1/2, 5, 7—Lewis-Hall Motors Corp., Detroit, Mich.
 Harvey—2, 2 1/2, 3 1/2, 6, 10—Harvey Motor Truck Co., Harvey, Ill.
 Hawkeye—1—Hawkeye Truck Co., Sioux City, Iowa.
 Hendrickson—2 1/2, 3 1/2, 5—Hendrickson Motor Truck Co., Chicago, Ill.
 Higrade—1, 1 1/2—Higrade Motors Co., Harbor Springs, Mich.
 H. R. L.—1, 1 1/2, 2 1/2—H. R. L. Motor Co., Seattle, Wash.
 Hug—1 1/2—The Hug Co., Highland, Ill.
 Hurlbutt—1 1/2, 2 1/2, 3 1/2, 5, 7—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.
 Huron—1 1/2, 2 1/2—Huron Truck Co., Bad Axe, Mich.
 Independent—1, 1 1/2, 2 1/2—Independent Motor Truck Co., Inc., Danport, Ia.
 Indiana—1, 1 1/2, 2, 2 1/2, 3 1/2, 5—Indiana Truck Corp., Marion, Ind.
 International—1, 1 1/2, 2, 2 1/2, 3, 5—International Harvester Co., Chicago, Ill.
 Jackson—3 1/2—Jackson Motors Corp., Jackson, Mich.

- Kalamazoo—1½, 2½, 3½, 5—Kalamazoo Motor Corp., Kalamazoo, Mich.
 Kearns—1½, 1¼, 1½—Kearns-Dughie Motors Co., Danville, Pa.
 Kelland—Kelland Motor Car Co., Newark, N. J.
 Kelly-Springfield—1½, 2½, 3½, 5, 6—Kelly-Springfield Motor Truck Co., Springfield, O.
 Keystone—2—Keystone Motor Truck Corp., Philadelphia, Pa.
 Kimball—2, 2½, 3, 4, 5—Kimball Motor Truck Co., Los Angeles, Cal.
 Kissel—1, 1½, 2½, 4—Kissel Motor Car Co., Hartford, Wis.
 Kleiber—1, 1½, 2, 2½, 3½, 5—Kleiber & Co., Inc., San Francisco, Cal.
 Koehler—1½, 2½, 3½, 5, T.T.—H. J. Koehler Motors Corp., Bloomfield, N. J.
 Lange—2, 2½—Lange Motor Truck Co., Pittsburgh, Pa.
 Lansden—¾, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.
 Larrabee-Deyo—1, 1½, 2½, 3½, 5—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
 Lombard—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
 Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
 ★Maccar—1½, 2, 3, 4, 5—Maccar Truck Co., Scranton, Pa.
 ★MacDonald—7—Union Construction Co., San Francisco, Cal.
 Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—International Motor Co., New York, N. Y.
 Mason Road King—1—Durant Motors, Inc., Long Island City, N. Y.
 Master—1½, 2, 2½, 3½, 4, 5, T.T.—Master Trucks, Inc., Chicago, Ill.
 Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
 Menominee—1, 1¼, 1½, 2, 3½, 5—Menominee Motor Truck Co., Clintonville, Wis.
 Milburn—Milburn Wagon Co., Toledo, O.
 Moline—1½—Moline Plow Co., Moline, Ill.
 Moreland—1, 1½, 2, 3, 5—Moreland Motor Truck Co., Burbank, Cal.
 Napoleon—1, 1½—Napoleon Motors Co., Traverse City, Mich.
 Nash—1, 2—Nash Motors Co., Kenosha, Wis.
 Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
 Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
 Niles—2—South Main Motor Co., Pittsburgh, Pa.
 Noble—1¼, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
 Northway—2, 3½—Northway Motors Co., Natick, Mass.
 Norwalk—1, 1½—Norwalk Motor Car Co., Martinsburg, W. Va.
 O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
 Ogden—¾, 1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.
 Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
 Oldsmobile—1—Olds Motor Works, Lansing, Mich.
 Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
 Oneida—2, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
 Oshkosh—2, 2½—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
 Overland—¾—Willis-Overland Co., Toledo, O.
 Packard—2, 3½, 5—Packard Motor Car Co., Detroit, Mich.
 Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.
 Parker—1, 2½, 3, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
 Patriot—1, 2, 3—Patriot Mfg. Co., Lincoln, Neb.
 Penn—2—Penn Motors Corp., 1714 N. Broad St., Philadelphia, Pa.
 Perfection—¾, 1¼, 2, 3—Perfection Truck Co., Minneapolis, Minn.
 ★Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
 Pioneer—1—Pioneer Truck Co., Chicago, Ill.
 Pittsburgher—1½, 2, 2½, 3, 3½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
 Power—1½, 3½—Power Truck & Tractor Co., St. Louis, Mo.
 Premocar—1½—Preston Motors Corp., Birmingham, Ala.
 Rainier—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., New York, N. Y.
 Ranger—2—Southern Motor Mfg. Ass'n. Ltd., Houston, Tex.
 Reliance—1½, 2½—Appleton Motor Truck Co., Appleton, Wis.
- Reo—1½—Reo Motor Car Co., Lansing, Mich.
 ★Republic—¾, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.
 ★Rowe—1½, 2, 2½, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.
 ★Ruggles—1, 2—Ruggles Motor Truck Co., Saginaw, Mich.
 Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
 Samson—¾, 1¼—Samson Tractor Co., Janesville, Wis.
 Sandow—1, 1½, 2½, 3½, 5—Moses & Morris Motors Corp., Chicago Heights, Ill.
 Sanford—1, 2, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
 ★Schacht—2, 3, 4, 5, 7—G. A. Schacht Motor Truck Co., Cincinnati, O.
 ★Schwartz—1, 2, 3, 5—Schwartz Motor Truck Co., Reading, Pa.
 ★Selden—1½, 2½, 3½, 5—Industrial Motor Corp., Rochester, N. Y.
 Service—¾, 1¼, 1½, 2, 3, 3½, 4—Service Motor Truck Co., Wabash, Ind.
 ★Signal—1, 1½, 2½, 3½, 5—Signal Truck Corp., Detroit, Mich.
 ★Southern—1, 1½, 2—Southern Truck & Car Corp., Greensboro, N. C.
 ★Standard—1¼, 1½, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.
 Steinmetz—Steinmetz Electric Motor Car Corp., Arlington, Baltimore, Md.
 Sterling—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.
 ★Stewart—1¼, 1½, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.
 Superior—1, 2, 2½—Superior Motor Truck Co., Atlanta, Ga.
 Tiffin—1½, 2½, 3½, 5, 6—Tiffin Wagon Co., Tiffin, Ohio.
 Titan—2, 3½, 5—Titan Truck Co., Milwaukee, Wis.
 Thormat Speed—1¼—Thormat Motor Co., Kent, Ohio.
 Tower—1½, 2½, 3½—Tower Motor Truck Co., Greenville, Mich.
 Traffic—1½, 2, 3—Traffic Motor Truck Corp., St. Louis, Mo.
 ★Transport—1, 1½, 2, 3, 3½, 5—Transport Truck Co., Mt. Pleasant, Mich.
 ★Traylor—1½, 2, 3, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.
 Triangle—1, 1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.
 Triumph—1½, 2, 2½—Triumph Truck & Tractor Co., Kansas City, Mo.
 Twin City—2, 3½—Twin City Company, Minneapolis, Minn.
 Ultimate—1½, 2, 2½, 3, 5—Vreeland Motor Co., Inc., Newark, N. J.
 Union—2½, 4, 6—Union Motor Truck Co., Bay City, Mich.
 ★United—1, 1½, 3½, 5—United Motor Products Co., Grand Rapids, Mich.
 U. S.—1¼, 1½, 2½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.
 Velle—1½, 2½—Velle Motors Corp., Moline, Ill.
 ★Vim—¾—Vim Motor Truck Co., Philadelphia, Pa.
 Walker—¾, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.
 Walker-Johnson—2, 2½—Walker-Johnson Truck Co., Woburn, Mass.
 ★Walter—2, 2½, 3½, 5, T.T.—Walter Truck Co., New York, N. Y.
 ★Ward—¾, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.
 Ward La France—2½, 3½, 5—Walker Motors, Inc., New York, N. Y.
 Watson—¾, 3½, T.T.—Watson Wagon Co., Canastota, N. Y.
 White—¾, 2, 3½, 5—White Co., Cleveland, Ohio.
 Wichita—1, 2, 3, 3½, 5½—Wichita Falls Motors Co., Wichita Falls, Tex.
 Wilcox—1, 1½, 2½, 3½, 5—Wilcox Trux, Inc., Minneapolis, Minn.
 Wilson—1½, 2½, 3½, 5—J. C. Wilson Co., Detroit, Mich.
 Winter & Hirsch—2½, 3½—Winter & Hirsch Motor Truck Co., Chicago, Ill.
 Winther—1, 1½, 2½, 3, 3½, 5, 7—Winther Motor Truck Co., Kenosha, Wis.
 Wisconsin (Loganville)—2, 2½—Wisconsin Truck Co., Loganville, Wis.
 Wisconsin (Sauk City)—1, 1½, 2½, 3½, 5—Wisconsin Farm Tractor Co., Sauk City, Wis.
 Witt-Will—1½, 2—Witt-Will Co., Inc., Washington, D. C.
 Wolverine—1, 1½, 2, 3, 5—American Commercial Car Co., Detroit, Mich.
 Yellow Cab—¾, 1¼—Yellow Cab Mfg. Co., Chicago, Ill.

★Indicates Advertisers. See Advertisers' Index.

Electric Taxicabs for New York Streets

One of the features of the annual New York Electrical and Industrial Exposition, held at the Grand Central Palace, October 7 to 14 was an electric taxicab built by Rauch & Lang for the Electrotaxi Co., of 1292 Madison Ave., New York.

A fleet of these cabs are soon to be put in operation on the streets of New York. It is the intention of the Electrotaxi Co., to work these cabs on double shifts, which will keep them on the streets from 18 to 20 hours a day. This is made possible by using two sets of batteries. It is said that an exhausted battery can be removed and a fully charged one installed in less than 10 minutes.

Specifications are as follows: Wheelbase, 102 in.; tires, 32 x 4½; motor, electric, especially built by Rauch & Lang; body of standard taxicab trimmed in hand buffed leather throughout; battery, 44 cells of 15 plate lead; controller, 5 forward speeds; painted in very attractive two-tone gray combination; headlights and bumpers, both front and rear.

Among the other exhibitors at the show were the Ward Motor Vehicle Co., dis-

playing an attractive 750 lb. capacity Ward commercial car with a panel body; the Edison Storage Battery Co., exhibiting a miniature roadway over which ran small electric trucks; the Commercial Truck Co.; the Steinmetz Electric Motor Car Co.; the Walker Vehicle Co.; the General Electric Truck Co.; The O. B. Electric Vehicle Co.; the Kelland Electric Truck Co.; and the Milburn Wagon Co.

The Electric Taxicab is Here

The model recently shown at the New York Electric Exhibition, built by Rauch & Lang, for the Electrotaxi Co. On account of its short wheelbase and quick smooth acceleration, it is easy to handle in traffic.



Fifth Ave. Bus to Incorporate in Delaware

A charter has been filed by the Fifth Avenue Bus Corp. in the State of Delaware. No details of the transportation plan were announced except that the capitalization would be \$40,000,000 and that the incorporators were, T. L. Croteau, J. A. Bruce and C. H. Blaske, all of Wilmington, Del.

Walter Tractor Snow Plow for City Streets

THE Walter tractor snow plows as used by the Fifth Ave. Coach Co., of New York City, are special four-wheel drive tractors equipped with a front plow blade and a center plow blade.

These machines have proven to be most efficient in cleaning snow from the routes of the Fifth Ave. Coach Co. in the past. The combination of front and center plows on one machine is very effective, in that the front plow removes the bulk of snow, while the center plow can be set so as to scrape right down to the road surface. This leaves an exceptionally clean street which is very important in order to prevent the freezing of a thin layer of snow or slush, which is of course a serious handicap for the safe operation of motor buses.

With a front plow alone, it is impossible to work as close to the ground, as the front end of the unit has more motion than the center.

The front plow blade is 10 ft. wide, while the center blade is 12 ft. wide. These

suspended drive and automatic locking differential, so that there is a positive drive to all four wheels and consequently maximum traction on all four wheels, which reduces the possibility of stalling the plow in deep snow or icy streets. As the front driving wheels are also steered, it is possible to direct the pushing power in the desired direction, so that the tractor follows its course and does not side-slip.

These tractors are made by the Walter Motor Truck Co., New York City, and the snow plows are made by the Good Roads Machinery Co.

New Atterbury Special Has Many Perfected Features

The Contractors' Special motor truck, manufactured by Atterbury Motor Car Co., Buffalo, N. Y., shown in the accompanying illustration, is worthy of comment because of its all-around suitability to the contractor's heavy duty service.



The First Plow Removes the Rough and the Center Scrapes Clean to Road Surface

blades can be turned to 45 deg. on either side so that the tractor can be used for either center snow piling or for piling on the sides of the street.

Either the front or center plows can readily be raised or lowered by means of large hand wheels. It is obvious that in order to push the double plow blades, it is necessary to have a tractor unit of exceptional power and traction.

The engine of the Walter tractor is a heavy-duty, four-cylinder type, developing 55 hp. A special five-speed transmission is provided, giving a large range of speeds. This permits fast operation at high speeds of 18 to 20 m.p.h., and at the same time the powerful low gear ratio provides ample power to meet any emergency.

The drive is distributed to all four wheels by means of the patented Walter

The foundation of the machine is the Atterbury chassis. The extra heavy construction of this chassis makes it fully able to withstand the rough going of road-building service.

This Atterbury Contractors' Special is Described as Filling the Contractors' Every Requirement.



The chassis wheelbase has been shortened to 132 in. to give short turning radius. This permits quick handling in narrow spaces. The heavy frame, 6½ in. deep by 2¾ in. wide and ¼ in. thick gives maximum strength in conjunction with such recognized units as Continental engine, Timken axles and Brown-Lipe transmission. Steel wheels and the new Rut-Proof Goodyear pneumatic tires are standard equipment.

The body was specially designed for road building service. It is equipped with a Heil hydraulic hoist giving a 43 deg. dumping angle. The hydraulic hoist gives better control in dumping and the use of the chain spreading device on the tail gate makes it possible to use the truck for stone spreading.

The body is fitted with steps on both sides for spreading and leveling the load. All corners are rounded to facilitate scavenging and the rear end of the body is fitted with slanting plates to confine the load to the skip when dumping. This feature in connection with the swinging lateral partition, allows both batches to be dumped into the skip without moving the truck, as was the case with the earlier side by side hopper bodies. This new outfit has the added advantage of being suited for year round work when road building activities are at a low ebb.

To Give Lectures on Electric Vehicle Maintenance

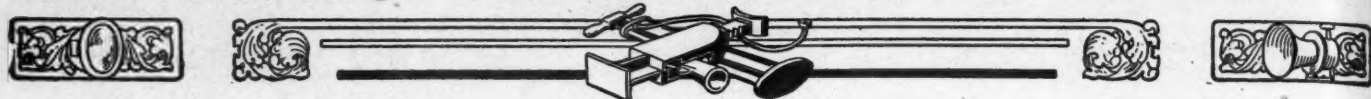
To meet the demand for information regarding electric motor truck operation and care brought about by the rapidly increasing use of the storage battery vehicle for city deliveries, the Electric Motor Truck Association is planning a course of instruction covering every phase of electric truck maintenance. These lectures will begin on Friday, December 8th and will be given on the second and fourth Fridays of each month throughout the winter. They will be held at the Electric Garage, 66th St. and Central Park, West, where there are complete facilities for studying batteries and their care, electric motors, the electric controllers and all the other parts of electric trucks. All of the lectures will be given by men who are recognized authorities in their respective fields.

Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

	36 x 6				38 x 7				40 x 8				42 x 9				44 x 10			
	Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure		Price	Carrying Capacity	Inflation Pressure	
Achilles Rubber & Tire Co., Binghamton, N. Y.																				
Achilles Cord, non-skid	30.00	30	3 1/2	30	83.00	2200	90	125.00	3000	100	100	100	125.00	3000	100	100	125.00	3000	100	
Acme Rubber Mfg. Co., Trenton, N. J.																				
Acme Cord, non-skid	16.00	29.00	31.00	35.00	72.00	2200	90	90.00	3000	100	100	100	90.00	3000	100	100	90.00	3000	100	
Alax Rubber Co., Inc., New York, N. Y.																				
Alax Improved Black Tread Cord, non-skid	14.65	29.15	30.85	37.70	78.55	2200	90	113.85	3000	100	110	110	113.85	3000	100	110	113.85	3000	100	
Amazon Rubber Co., Akron, O.																				
Amazon Cord, non-skid	15.95	29.15	30.85	37.70	70.25	2200	90	120.00	3000	100	110	110	120.00	3000	100	110	120.00	3000	100	
Armstrong Rubber Co., Inc., Garfield, N. J.																				
Armstrong Super Size Cord, non-skid	15.95	30.60	32.40	39.60	86.00	2200	90	117.95	3000	100	110	110	117.95	3000	100	110	117.95	3000	100	
Bieker Tire & Rubber Co., St. Paul, Minn.																				
Bieker Cord, non-skid	33.45	35.40	41.95	43.90	97.50	2200	90	156.75	4000	110	110	110	156.75	4000	110	110	156.75	4000	110	
Braender Rubber & Tire Co., Rutherford, N. J.																				
Braender Bull-Dog Super, non-skid cord	14.65	29.15	30.85	37.70	81.35	2200	90	152.00	4000	110	110	110	152.00	4000	110	110	152.00	4000	110	
Brunswick-Balke-Collender Co., Chicago, Ill.																				
Brunswick Cord, Flat Tread, non-skid	16.50	29.15	30.85	37.70	80.45	2200	95	113.85	3000	105	115	115	113.85	3000	105	115	113.85	3000	105	
Burdick Tire & Rubber Co., Noblesville, Ind.																				
Alr Bag Cord, non-skid	39.50	58.75	62.25	67.25	143.00	2200	90	184.00	3000	100	110	110	184.00	3000	100	110	184.00	3000	100	
Canton-Blackstone Co., Youngstown, O.																				
Canton Cord, non-skid	20.00	33.45	35.35	43.25	82.65	2200	90	115.45	3000	100	110	110	115.45	3000	100	110	115.45	3000	100	
Columbia Tire & Rubber Co., Mansfield, O.																				
Columbia Cord Giant	17.60	22.90	24.60	30.65	81.45	2200	90	152.10	4000	120	120	120	152.10	4000	120	120	152.10	4000	120	
Combination Rubber Mfg. Co., Bloomfield, N. J.																				
Combination Viking Fabric, non-skid	14.90	22.90	24.60	30.65	74.40	2200	90	133.85	3000	100	100	100	133.85	3000	100	100	133.85	3000	100	
Combination Viking Cord, non-skid	17.20	29.15	30.85	37.70	74.40	2200	90	133.85	3000	100	100	100	133.85	3000	100	100	133.85	3000	100	
Dayton Rubber Mfg. Co., Dayton, Ohio																				
Thorbred Cord, non-skid	17.95	32.75	34.95	41.75	82.25	2200	90	120.10	3000	100	110	110	120.10	3000	100	110	120.10	3000	100	
Empire Tire & Rubber Co., Trenton, N. J.																				
Empire Cord, non-skid	14.60	29.15	30.85	37.70	76.30	2000	90	108.00	2700	100	100	100	108.00	2700	100	100	108.00	2700	100	
Erie Tire & Rubber Co., Sandusky, O.																				
Erie Cord, non-skid	15.95	29.15	30.85	37.70	76.50	2200	90	115.50	3000	100	110	110	115.50	3000	100	110	115.50	3000	100	
Falls Rubber Co., Cuyahoga Falls, O.																				
Falls Cord, non-skid	18.00	34.00	36.50	43.25	85.50	2200	90	148.50	4000	110	110	110	148.50	4000	110	110	148.50	4000	110	
Federal Rubber Co. of Illinois, Cudahy, Wis.																				
Federal Cord	17.85	30.00	32.00	38.00	70.00	2200	90	105.00	3000	100	100	100	105.00	3000	100	100	105.00	3000	100	
Federal Cord clincher	17.85	30.00	32.00	38.00	70.00	2200	90	105.00	3000	100	100	100	105.00	3000	100	100	105.00	3000	100	
Firestone Tire & Rubber Co., Akron, O.																				
Firestone Cord, non-skid	12.90	28.55	30.75	36.80	82.65	2200	90	118.55	3000	100	120	120	118.55	3000	100	120	118.55	3000	100	
Flak Rubber Co., Chicopee Falls, Mass.																				
Flak Truck Cord	12.90	28.55	30.75	36.80	82.65	2200	90	118.55	3000	100	120	120	118.55	3000	100	120	118.55	3000	100	
Gates Rubber Co., Denver, Colo.																				
Gates Cord, non-skid	12.90	28.55	30.75	36.80	82.65	2200	90	118.55	3000	100	120	120	118.55	3000	100	120	118.55	3000	100	
General Tire & Rubber Co., Akron, O.																				
General Cord, non-skid	15.95	29.15	30.75	37.75	91.25	2200	90	126.95	3000	100	110	110	126.95	3000	100	110	126.95	3000	100	
Gillette Rubber Co., Eau Claire, Wis.																				
Gillette Cord, non-skid	15.95	29.15	30.75	37.75	91.25	2200	90	126.95	3000	100	110	110	126.95	3000	100	110	126.95	3000	100	
Goodrich, B. F., Rubber Co., Akron, O.																				
Goodrich Heavy Duty Cord	13.50	29.15	30.85	37.70	85.75	2200	90	119.70	3000	100	120	120	119.70	3000	100	120	119.70	3000	100	
Goodrich Silvertown Cord	13.50	29.15	30.85	37.70	85.75	2200	90	119.70	3000	100	120	120	119.70	3000	100	120	119.70	3000	100	
Goodyear Tire & Rubber Co., Akron, O.																				
Goodyear Cord, All-Weather Tread	18.00	32.50	34.50	42.70	90.00	2200	90	154.25	4000	110	110	110	154.25	4000	110	110	154.25	4000	110	
Goodyear Rut Proof	18.00	32.50	34.50	42.70	90.00	2200	90	154.25	4000	110	110	110	154.25	4000	110	110	154.25	4000	110	
Goodyear Cross-Rib	18.00	32.50	34.50	42.70	90.00	2200	90	154.25	4000	110	110	110	154.25	4000	110	110	154.25	4000	110	
Goodyear Triangle Cord, non-skid	18.00	32.50	34.50	42.70	90.00	2200	90	154.25	4000	110	110	110	154.25	4000	110	110	154.25	4000	110	
Gordon Tire & Rubber Co., Canton, Ohio																				
Gordon Triangle Cord, non-skid	18.00	32.50	34.50	42.70	90.00	2200	90	154.25	4000	110	110	110	154.25	4000	110	110	154.25	4000	110	
Grand Rapids Tire & Rubber Corp., Grand Rapids, Mich.																				
Grand Rapids Cord, non-skid	15.95	29.15	30.85	37.70	85.75	2200	90	119.70	3000	100	120	120	119.70	3000	100	120	119.70	3000	100	
Hewitt Rubber Co., Buffalo, N. Y.																				
Hewitt Cord, non-skid	15.95	29.15	30.85	37.70	85.75	2200	90	119.70	3000	100	120	120	119.70	3000	100	120	119.70	3000	100	
Howe Rubber Corp., Inc., New Brunswick, N. J.																				
Howe Ultra Cord, non-skid	33.10	35.45	42.25	44.20	82.65	2200	90	115.40	3000	100	100	100	115.40	3000	100	100	115.40	3000	100	
India Tire & Rubber Co., Akron, O.																				
India Cord, non-skid	16.95	28.90	30.70	38.45	77.30	2200	90	108.05	3000	100	110	110	108.05	3000	100	110	108.05	3000	100	
Iowa Cord Tire Co., Inc., Des Moines, Ia.																				
Iowa Cord, non-skid	17.85	29.93	31.68	38.77	68.21	2200	90	89.80	3000	100	100	100	89.80	3000	100	100	89.80	3000	100	
Iowa Fabric, non-skid	11.00	24.70	26.51	33.01	58.21	2200	90	89.80	3000	100	100	100	89.80	3000	100	100	89.80	3000	100	
Kelly-Springfield Tire Co., New York, N. Y.																				
Kelly-Springfield Cord, Kant Slip	14.65	29.10	30.95	37.80	79.65	2200	90	109.40	3000	100	110	110	109.40	3000	100	110	109.40	3000	100	
Kenyon Co., Inc., Brooklyn, N. Y.																				
Kenyon Cord, non-skid	15.95	29.15	30.85	37.70	70.00	2200	90	119.70	3000	100	120	120	119.70	3000	100	120	119.70	3000	100	
Kenyon Duro-Cord	12.50	25.65	26.65	30.60	58.50	2200	90	89.80	3000	100	100	100	89.80	3000	100	100	89.80	3000	100	

[illegible]

TRUCK EQUIPMENT AND APPLIANCES



New Lycoming Engine Featured by Five-Bearing Crankshafts

A STIFF five-bearing crankshaft and a system of forced feed lubrication, in which the pressure is controlled by the throttle, are among the more important features of the new Lycoming engine, known as the model C series just offered by the Lycoming Motors Corp., Williamsport, Pa., in $3\frac{1}{2}$, $3\frac{5}{8}$ or $3\frac{3}{4}$ -in. bore and 5-in. stroke.

The engine can be had with either Lynite or cast iron pistons. The cylinder block, the upper half of the crankcase and the detachable cylinder head are all gray iron castings. The crankcase is stiffened by the webs which carry the main bearings. The flywheel housing is an integral part of this casting.

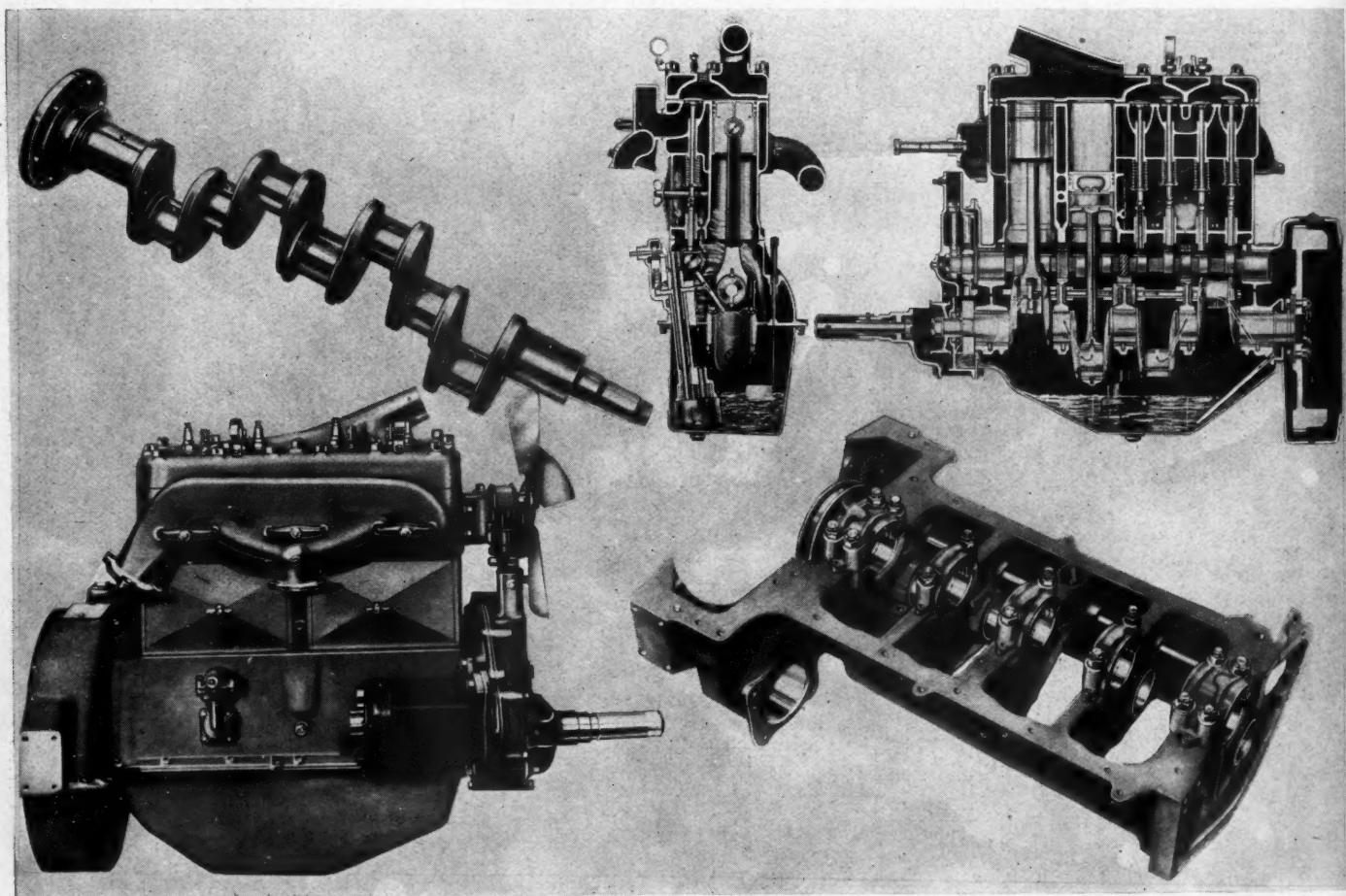
The flywheel is attached by means of six $\frac{1}{2}$ -in. bolts to a 6-in. flange forged integral with the crankshaft. All bearing surfaces are ground and the crankshaft is drilled for force feed lubrication to main and connecting rod lower bearings. The finished shaft is tested for dynamic balance. The crankshaft is carried in five main bearings.

Both types of pistons are fitted with .003-.004-in. clearance at the first land. The Lynite pistons are of the split-skirt type. Three piston rings are used, all located above the piston pin. Two of the rings are $\frac{1}{8}$ -in. wide and the third is $\frac{3}{16}$ in. The piston length is $4\frac{1}{8}$ in. in diam. and $2\frac{29}{32}$ in. long. They are made of

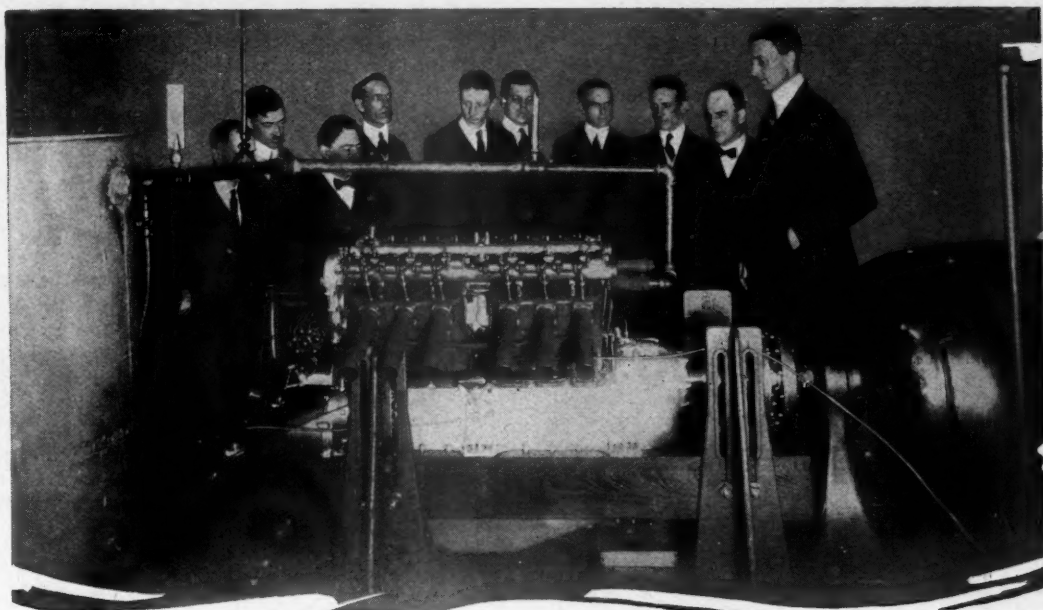
case-hardened steel, drilled hollow and ground.

Full-floating piston pins are used in the Lynite pistons, endwise movement being prevented by snap rings in the piston pin bosses. The connecting rod is bronze bushed. When cast-iron pistons are used, the piston pin is clamped in the connecting rod, the bearing being in the bosses.

The connecting rods are of L-beam section. The length from the center of the piston pin bearing to the center of the crank pin bearing is 12 in. Bronze-backed, babbitt-lined bearings, ground to size, are used in the big ends. The cap is held in place by two $\frac{7}{16}$ in. nickel-steel, heat-treated bolts. The main bearings are also



Upper Left: View of the Five-Bearing Crankshaft, One of the Features of the New Lycoming Engine. Upper Right: Cutaway Sections, Showing Water Circulation, Oil Transmission and Fuel and Exhaust Gas Passages. Lower Left: General Exterior View, Showing Compactness and Accessibility. Lower Right: The Main Bearing Layout on Crankcase



From Aeroplanes to Trucks Power Units Are Ball Bearing Equipped

NOT ONLY in the most highly developed aeroplane engines but in the power plants, transmissions, differentials, etc., of high grade pleasure cars and motor trucks, deep-groove ball bearings, made by the Hess-Bright Manufacturing Company, are almost invariably found.

The heavy ball bearing rings of uniform cross-section are susceptible to great accuracy in manufacture and maintain that accuracy in service, while the form of cross-section gives the races great resistance against distortion and warping.

Furthermore, the depth of grooves and the uniform cross-section of the races enable a single bearing to carry heavy thrust loads in either direction in addition to a radial load. This permits either face to be applied to the load and makes the bearing fool-proof in assembly and reversible in practice.

Let our engineers co-operate in providing your customers with the benefits of these inherent characteristics found only in deep-groove ball bearings.

THE HESS-BRIGHT MANUFACTURING COMPANY

Supervised by **SKF** INDUSTRIES, INC., 165 Broadway, New York City

B55



Races displaced to show DEEP-GROOVE bearing carrying maximum end thrust in a forward direction.

Races displaced to show THE SAME bearing carrying maximum thrust in reverse direction.

BALL BEARINGS
The Highest Expression
of the Bearing Principle

Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

bronze-backed, babbitt-lined. No shims are used to fit the bearings. They are fly cut and line reamed to a clearance of .0015 in. to allow for the oil film.

The valves are interchangeable and have cast-iron heads electrically welded to steel stems. The valve lift is $11/32$ in. and the effective working diameter is $1\frac{1}{8}$ in.

The camshaft is carried in four removable bronze bushings. A spring-operated plunger bearing on a hardened steel button on the front end of the camshaft takes the end thrust and automatically adjusts for wear in the timing gears, which are helically cut. The crankshaft and generator gears are fiber and the camshaft gear is cast iron. Removal of the timing gear cover renders these gears easily accessible. The flywheel is of semi-steel and the teeth for the starting motor are cut in the periphery of the flywheel.

The intake and exhaust manifolds are an integral casting which is held in position by clamps. Proper alignment between the intake manifold and the intake ports is secured by means of steel sleeves fitted into the intake ports. A hot spot is provided to assist in the vaporization of the fuel.

Cooling is by thermo-syphon. The fan drive pulley is mounted on the front end of the crankshaft, and there is ample clearance for removing and replacing the fan belt. The belt is a $1\frac{1}{4}$ -in. flat type. The fan is carried on an adjustable supporting bracket which is fastened to a pad on the front end of the cylinder block.

Provision is made for mounting the ignition unit at the front end of the gear case over the timing gears. It is driven off the camshaft gear by a spiral gear. The mounting is adapted to take any standard make of distributor. The rotation of the distributor is clockwise when looking down on it from above the engine.

Pressure lubrication is used. Oil is carried under pressure to all main, connecting rod big end and camshaft bearings. The entire circulating system is contained in the upper half of the crankcase.

The gear type of oil pump is driven at camshaft speed by spiral gears located at the center of the camshaft. It is supported by the upper half of the crankcase but extends down into the oil reservoir. This construction permits removal of the oil pan without interference with other parts of the lubrication system. The pump in-

take is always immersed in oil and requires no priming.

The pump discharges directly into a distributor tube cast into the upper half of the crankcase. This tube is connected by holes drilled through the webs to all camshaft and main bearings. A nozzle on the front end of the distributor tube directs a continuous stream of oil onto the timing gears. Valves, pushrods, pistons and piston pins are lubricated by oil thrown off the crankshaft.

The oil pressure varies from 2 to 5 lb. at idling speeds up to 25 lb. at wide-open throttle. A pressure relief valve is provided which discharges into a by-pass leading back to the oil reservoir. This relief valve is connected to the throttle control. In this way, the oil pressure is regulated to conform to the load on the engine. Maximum pressure is secured with wide-open throttle and minimum with closed throttle.

An oil strainer is provided at the pump inlet. The oil-level indicator is operated by a cork float and is in plain view on the side of the engine. The combined oil filler and breather is constructed with suitable baffles to prevent escape of oil.

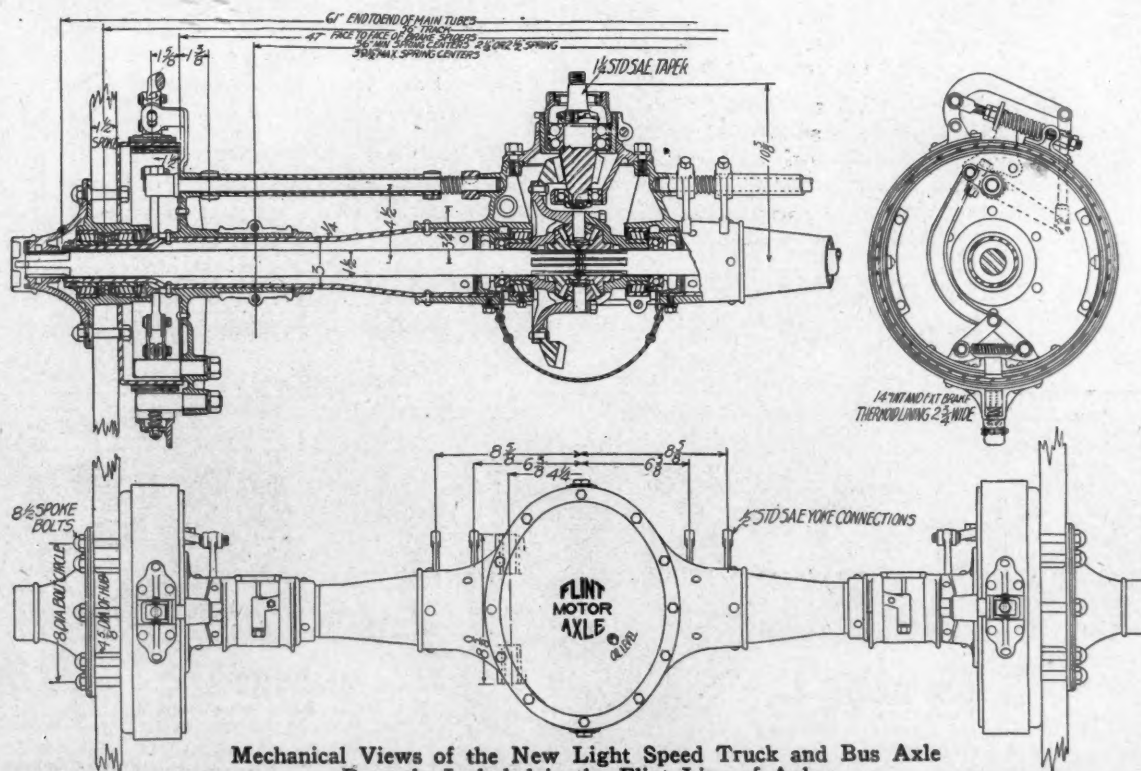
Flint Offers New Axle for Light Trucks and Buses

ACCORDING to a recent announcement, the line of the Flint Motor Axle Co., Flint, Mich., now includes a new one-ton axle for light speed trucks and buses. Although patterned largely after the design of the passenger car axle, it differs in that the var-

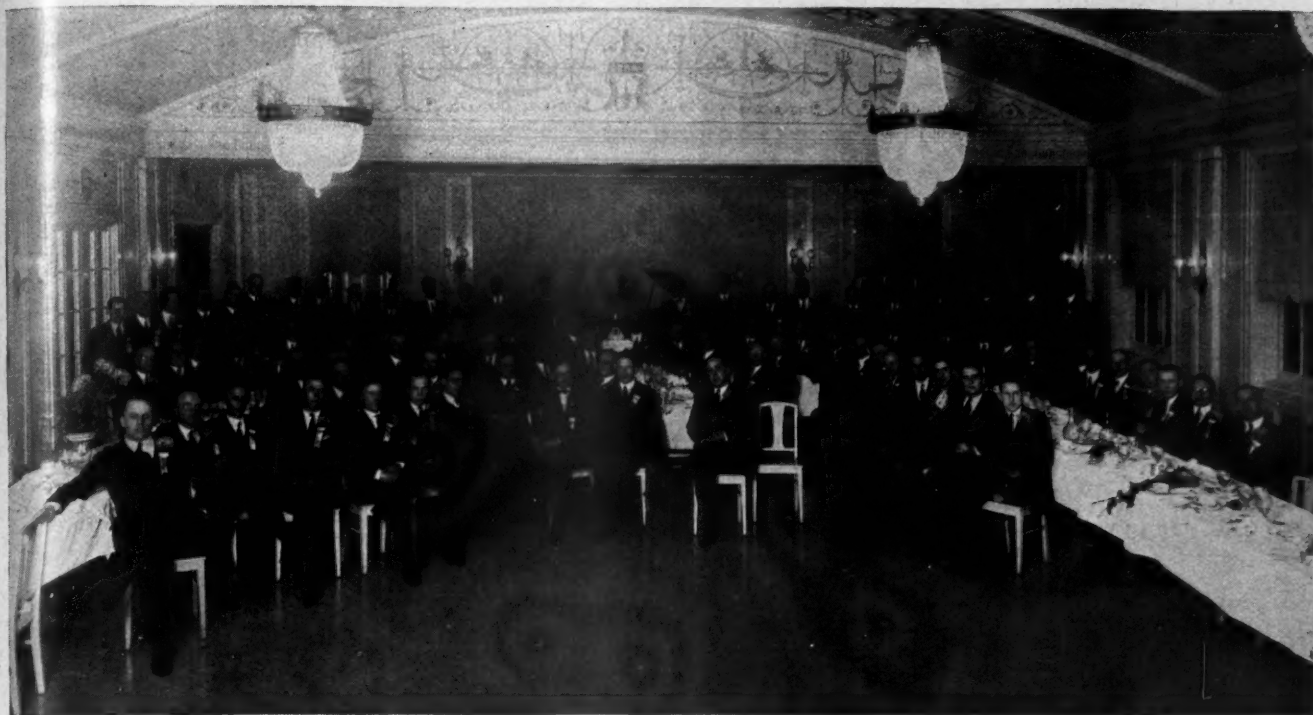
ious units which make it up are of heavier construction, enabling it to effectively withstand the added stresses incurred by heavier loads. The spiral bevel gear and pinion, for example, are of larger dimensions than those employed in the passenger car axles.

The pinion shaft of this axle is supported by ball bearings on both sides of the pinion, giving a straddle construction. This more rigid construction on the pinion shaft is claimed to insure a true pitch line contact.

The gear case or center housing is cast



Mechanical Views of the New Light Speed Truck and Bus Axle Recently Included in the Flint Line of Axles



Photograph taken at Ruggles dealer convention held at Saginaw, Michigan, November 21 and 22, 1922

Greetings:

We Ruggles dealers send greetings to you who are considering joining our family.

The big Ruggles birthday party is over. The anniversary of the completion of the first Ruggles Truck was a huge success and the spirit of optimism born there goes marching on.

Now we *know* why Frank Ruggles is so confident of the next twelve months. He gave us a glimpse of the future and we realize our good fortune in holding Ruggles franchises.

The secret is not ours to tell, but every dealer who joins the Ruggles organization in the next sixty days will have reason to be glad.

THE RUGGLES GO-GETTERS

THE RUGGLES MOTOR TRUCK COMPANY
Saginaw, Michigan London, Ont., Canada

RUGGLES

The World's Greatest Truck Value

in one piece. It is of malleable iron. The tube hole is bored to the same diameter as is required for the bearings on the sides of the differential. This is done for production purposes. Malleable casting permits of lower priced manufacture than the usual pressed steel housing construction, or by the method of building up a one-piece gear housing.

Six roller bearings, all of the same size, are provided on the two main shafts. The shaft is splined on both ends. The hub has a pressed fit and the side gear and differential have a slide fit in the splines. The main tubes, which are of 30-40 carbon steel, are of large diameter, narrowing down to 3 in. diam. at the spring support. The main axle shafts are 1½ in. in diam.

This axle is designed to support two tons, live and dead loads, and the front axle is designed to maintain load carrying capacities of from 1400 to 2200 lb.

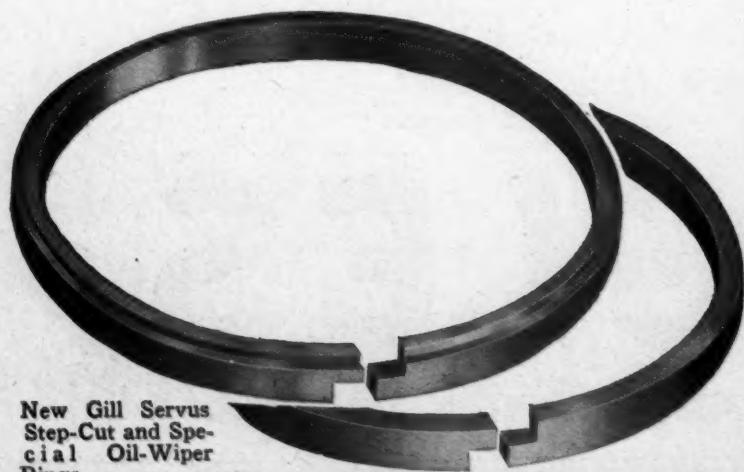
The loads mentioned are those for which the axle is guaranteed, and in the design of the axle, factors of safety of from 6 to 9 are claimed to have been incorporated. This floating type axle is furnished in final gear ratios of 4.9; 4.4; 5.2, and 5.5 to 1. It is also furnished in either torque arm or Hotchkiss type drive.

New Gill Piston Ring

The accompanying illustration depicts the new Servus Step-Cut and the Special Oil-Wiper rings, which were introduced by the Gill Mfg. Co., 8300 S. Chicago Avenue, Chicago, Ill., at the Automotive Equipment Association exhibit last month.

The first mentioned is a ring of gray iron, individually cast, lathe turned and machined to accurate size. The lathe-turned surface is claimed to assure quick seating.

The oil-wiper ring, the production of which is similarly careful and accurate, is provided in addition with an edge that distributes the fresh oil in a thin film on the cylinder walls, carrying ahead of it excess oil, carbon and any abrasives that might score or otherwise damage the cylinder walls. It is declared to prevent smoking. Its surface is also of the quick-seating construction.

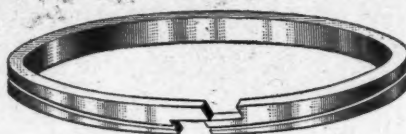


New Gill Servus Step-Cut and Special Oil-Wiper Rings.

Wicaco Twin-Cut Ring

The Wicaco Twin-Cut Piston Ring, manufactured by Wicaco Screw and Machine Wks., Stenton Ave. and Loudon St., Phila., Pa., is made from individual castings of close-grained, gray iron, and is concentric in construction and machined to micrometrical correctness.

A wandering oil groove is its salient feature. Wicaco rings are marketed six



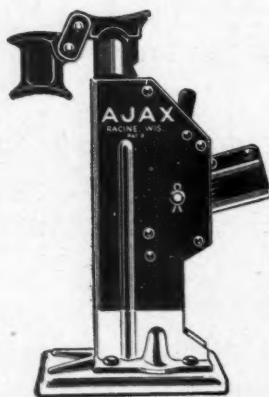
Oil-Groove Wicaco Twin-Cut Ring

rings to the box, the receptacle itself being telescope in construction and attractively labeled. This method eliminates the possibilities of broken stock on either the dealer's shelf or in the store-room. It is made in all popular sizes and oversizes. Prices range from \$0.50 to \$1.50 retail.

Ajax Jack

An increased range of lift, without increased bulk, weight and mechanism, is provided by the tip-over head model Ajax jack, which is the latest addition to the Ajax Auto Parts Co., Racine, Wis., line of Red Base jacks. This jack was exhibited at the recent Chicago A. E. A. show.

The body units of this jack are riveted together and the base is wide and strong.



Left: The New Double-Capacity Ajax Jack

Below: Selfblo Automatic Blowing Alcohol Torch.



Selfblo Alcohol Torches

The new alcohol torch put out by The Hunt-Lasher Company, Inc., Lynn, Mass., requires no blowing through a rubber tube, no pumping nor priming in order to produce a blast. All that is necessary is to fill both barrels with denatured alcohol and light the pilot wick. In twenty seconds' time it emits a clean, intense flame of over 1400° Fahrenheit. This flame, of course, is hot enough to run any kind of solder. The torch consists of two barrels made of seamless brass tubing and ingeniously held together by a double-spring clip furl. The torch is heavily nicked and highly polished. An attractive three-colored inclined counter display for the retail trade goes free with every half dozen Selfblos.

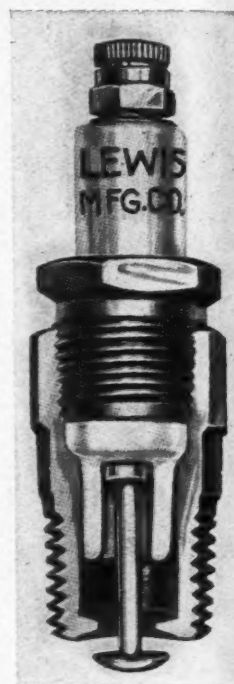
The tip-over feature, which, as may be readily observed from the accompanying illustration, consists of an additional section of head that may easily be employed, should there be need of increased height, by swinging it over into place over the permanent head.

One spring and two dogs makes up the actuating mechanism. This jack made to accommodate 3000 and 4000 lb. lists at \$2.75 and \$3.50 respectively.

Lewis Spark Plug

The Lewis Spark Plug, made by the Lewis Mfg. Co., 42 E. Chestnut Street, Columbus, O., is of two-piece construction with a porcelain or core of the petticoat type. The lower base of the shell

has an opening just large enough to receive electrode without shorting. The firing button, together with the closed bottom of the shell, protects the core and electrode from heat and oil, thereby, it is stated, giving better service in oil-pumping cylinders. It is explained that the electrode, being the same size from top to bottom, permits the full flow of current to the firing point, thus producing a fat hot spark in the combustion chamber. Prices, \$0.50, \$0.60 and \$0.75 each.



Two-Piece Lewis Plug



Here is the wheel for trailers!

IN several ways, service on trailers makes even stiffer demands on the wheels than does service on trucks.

The wheels of trailers have to endure the strains caused by constant swaying from side to side and by frequent skidding. Also, they must resist continued exposure to the elements, because trailers are usually left outdoors, unprotected, in all weather.

The *rolled* steel construction of Bethlehem Wheels adapts them ideally to fulfill the requirements of trailer service. The spokes of Bethlehem Wheels are grooved, giving them tremendous resistance to lateral

thrusts. Climatic conditions never affect Bethlehem Wheels in any way; the spokes never warp or loosen.

And, on both trailers and trucks, the Bethlehem Wheel's combination of strength, with light weight and resiliency, is a decided factor in attaining economical and all-'round satisfactory service.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Sales Offices in the Following Cities:

New York	Baltimore	Pittsburgh	Buffalo
Boston	Washington	Cleveland	Chicago
Philadelphia	Atlanta	Detroit	St. Louis
	San Francisco		

BETHLEHEM ROLLED STEEL TRUCK WHEELS

Detroit Trailer Equipped With Bethlehem Wheels



Ⓢ THIS SYMBOL IN ANY ADVERTISEMENT MEANS: SEE "CHILTON
AUTOMOBILE DIRECTORY" FOR COMPLETE BUYING INFORMATION Ⓢ

ROSS STEERING GEARS

As manufacturer, owner or driver of a motor truck, it is significant to you that, according to our present active sales record

181 motor truck manufacturers are now using Ross Steering Gears as standard equipment; while, checking with the complete list of manufacturers as given in the Commercial Car Journal for Oct. 15, 1922, we find only

61 motor truck manufacturers listed who are not using Ross Steering Gears, this number including many who manufacture their own steering equipment.

Since Ross Steering Gears are not *cheap* gears, this predominance is evidently due entirely to the quality of the gear itself and the superior service that it gives in easy steering, safety and reliability.

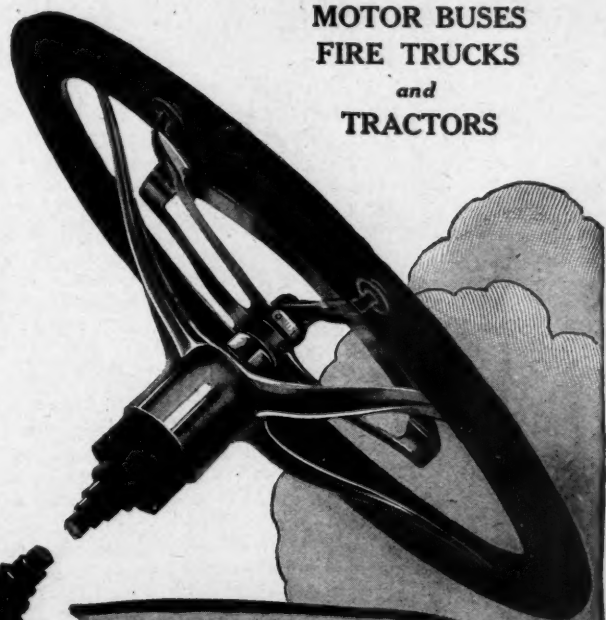
Ross Passenger Car Gears

Ross Steering Gears are now available also for passenger cars, offering the same easy steering, safety and reliability which have won predominance in the motor truck field.

ROSS GEAR & TOOL COMPANY
760 Heath St. Lafayette, Indiana, U.S.A.

Write for further information regarding Ross Steering Gears for motor trucks, passenger cars, motor buses, fire trucks or tractors.

for
MOTOR TRUCKS
PASSENGER CARS
MOTOR BUSES
FIRE TRUCKS
and
TRACTORS



The Steering Gears that Predominate on Motor Trucks

work. The times in the shop were secured by running through a number of similar operations by different men and a fair average secured. These time studies were over a period of three months and were carefully checked. The men were not advised of the studies as it was desired that they should work along usual lines.

At the time the writer visited the station the piecework had been in effect sufficiently long to prove its worth. The men were gradually prepared for the change by Mr. Renolde who from time to time dropped hints as to the plan. In other words the men were gradually sold and it was not long before their interest was manifest by asking when the plan was to start. When the first piecework operations were put into effect a few of the men objected and would not accede to the plan which resulted in their resigning. Their places were filled, however, by mechanics who appreciated the opportunity given to **demonstrate their skill and to be paid on a production basis.** The men who remained are entirely satisfied with the plan and the only objection is that all work is not piecework. There is straight time work (on obsolete models), also maintenance, which is paid for on the old basis of so much an hour. In time the greater part of the operations will be on piecework, data being prepared to bring this about. Of course there will always be a certain amount of maintenance work at the hour rate, such as overhauling the service wagon, equipment, etc.

Mechanic Earns and is Paid More

Coming to the most important factor in the mind of the mechanic, does he earn more and is he satisfied? The writer was privileged to go over the charts and costs sheets of the service department and the company maintains a simple but comprehensive system of knowing where it stands from day to day in its service department. Weekly wage sheets showed the earnings of the present system versus what it would have been under the old. Generally speaking, the mechanics are averaging at the present time about 20 per cent greater earning capacity. In other words their pay envelope is 20 per cent fatter and this is what really counts in the long run with the mechanic. In time as the piecework is more generally employed, the earnings should increase proportionately.

The system has improved the morale of the shop and the profit is increased. Now the shop is in a position to know what it costs for a certain operation and what to charge the customer for that operation. If the men work faster there is more work turned out and, consequently better service from the time element standpoint.

Getting down to brass tacks it means that the shop increases its profits, because of greater production and the men increase their wages by greater efforts. In some instances it has been possible to reduce the flat rate of an operation to the customer. A number of these were shown the writer. Another factor is that the men are being really paid less per hour, but are earning more. By this is meant that in comparison with the straight time

basis, the men would be receiving less money per hour, but in reality they receive more money, because they produce more in the hour or fraction thereof.

There is one operation in the schedule in which the men must put in a definite amount of time so the piecework does not apply. This is the tune-up of the power plant. If the time calls for two hours, that time must be spent on the job so that it is thorough.

Records are maintained of the operations and these checked up every so often. There is not a large clerical force to do this although some objectors to the flat rate, and piecework, claim that the cost of making, keeping and checking records is so large that the system is not practical from a financial standpoint.

Williams & Hastings have devised a most excellent form for taking the customer's order, keeping record of the operations, Material, etc., and for knowing whether or not the shop is paid or the house pays. These forms are appended and a little study will reveal their merits.

Is Car and Truck Service Different?

Of course this article deals with a passenger car distributor's service station methods, but in the final analysis what is the difference between the truck and passenger car service? Granted that the truck is better serviced from the standpoint of non-delays, which is debatable, how about the costs to the owner and his satisfaction? And how about the truck

mechanics? Is it not logical to assume that a truck dealer who places his shop on a production basis—piecework—will cut down the time the truck spends in the station? And won't flat rate and piecework mean less cost of maintenance to the truck owner? And won't the right kind of mechanics earn better wages with piece-work methods, call it production or efficiency or any old name? And won't the shop earn more money if the service head can install and operate a system such as the passenger car distributor referred to? And wouldn't the kicking owner be robbed of his kick if he could be informed that a certain piece of work would cost him exactly so much and would be done at a certain time? And last but not least, wouldn't the truck dealer who serviced as does Williams & Hastings, have the jump on his competitor who believes in the old labor and material method?

You bet he would in sales. And sales after all is the thing that is worrying the factory executive, the dealer and distributor and his entire sales organization. When a truck dealer can lay his cards on the table and tell the customer what it will actually cost him to operate and maintain his truck, on a ton-mile, package, etc. basis, and prove the claims, then much of the sales resistance will fade. If the truck industry is to progress as it eventually will, more selling must be done from the back door and not from catalogs and photographs plus liberal allowances for the old truck.

RECEIVED IN SHOP		PHONE NO.	CAR	MODEL	CAR NO.	DATE	REPAIR JOB NO.
							18466
			TYPE	LICENSE NO.	GAS GAUGE	MILEAGE	
					E 14 15 16 F		
OWNER'S NAME			ADDRESS				
Item No.	WORK ORDER—USE A SEPARATE LINE FOR EACH ITEM						OPERATION NO.
1							WORKMAN'S NO.
2							
3							
4							
5							
6							
7							
8							
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17							
18							
REPORT ANY OTHER WORK REQUIRED TO FOREMAN						WORK ORDER BY	FOR NOTES SEE OTHER SIDE
OWNER PLEASE SIGN HERE			AGENT SIGN HERE		CAR PROMISED	ORDER TAKEN BY	
WILLIAMS & HASTINGS, Inc.—SHOP COPY			WILLIAMS & HASTINGS, Inc.—FOREMAN'S COPY		CAR PROMISED	ORDER TAKEN BY	

The Shop Record Gives the Operation and Workman's Number

The mechanic on starting the work does not know whether the owner or the house is to pay for the work. The foreman's copy is similar to shop except columns are provided to indicate to whom work is to be charged. This copy is ultimately destroyed

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tric cast steel commercial car wheels.

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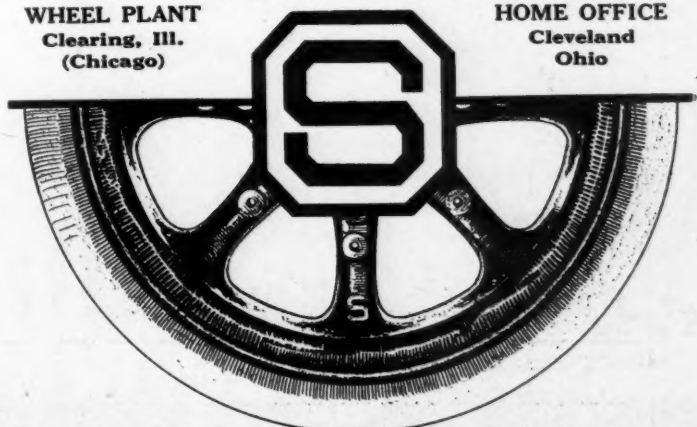
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Consider, for a Moment, These Five Points:

1 Complete Line of Quality Trucks

International Motor Trucks are built in fourteen sizes, from the 2000-lb.-capacity Speed Truck to the 10,000-lb., heavy-duty model. The International line includes Speed Sedans, Ambulances, Busses, Funeral Cars, Fire Trucks, Street Flushers, Power Sweepers, Oil Trucks, Dump Trucks, Lumber Units, Log Rollers, Tractor Trucks, and hauling units for every commercial purpose—a line offering the International dealer an unequalled sales opportunity.

2 Liberal Financing Plan

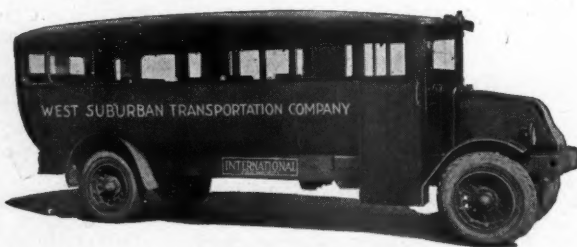
Our financing plan enables International Motor Truck dealers to do a large volume business on a comparatively small investment. It appeals at once to both the dealer and the prospective buyer. Often it is the final inducement which makes the difference between a prospect and a buyer.

3 Sales Promotion Campaign

Our nation-wide advertising in leading magazines and newspapers is creating new business for the International Motor Truck dealer. However, we go further than this—we help each dealer sell his prospects. A direct mail campaign is sent to a selected list of prospects in each territory. Bill posting including the dealer's name completes an advertising campaign unequalled by any other manufacturer.

4 Personal Sales Help

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One of a fleet of large-capacity busses. This model is attracting the attention of bus operators everywhere.

For No. 5 Please See
the Following Page

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